



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

Edw. T
118.46.830





3 2044 096 994 694

RECOMMENDATIONS.

THE ATTENTION OF TEACHERS AND SUPERINTENDENTS IS RESPECTFULLY
INVITED TO THE FOLLOWING RECOMMENDATIONS OF
THOMSON'S MENTAL ARITHMETIC.

*From E. G. STORKE, Esq. County Superintendent, Cayuga
County, N. Y.*

Messrs. J. C. DERBY & Co.:—I am much pleased with "Thomson's First Lessons" in arithmetic. I am convinced that it is more happily adapted to the *public school room*, than any other mental arithmetic now extant. In those which I have used I have generally met with this difficulty—they were either too simple or too abstruse; being adapted to the nursery, or else beyond the reach of those for whom they were intended. Although Colburn's work is faultless in every other respect, it will still be admitted, I think, that its progress is much too rapid for children from five to nine years of age. For those as well as for others more advanced, I hazard nothing in saying that practical teachers will find the work of Prof. Thomson peculiarly fitted; and that it will be speedily introduced and generally used, is the confident expectation, and sincere wish of

Yours, respectfully and truly

E. G. STORKE.

Auburn, May 9, 1846.

*From WM. F. PHELPS, Esq. Teacher of the Model School, at-
tached to the New-York State Normal School.*

I fully concur in the above recommendation of Mr. Storke, and take pleasure in adding that the plan and arrangement of the work, are superior to any with which I am acquainted. The directions for using that almost indispensable piece of apparatus—the *Numerical Frame*, and the notes for the aid of the young teacher—contribute greatly to its usefulness and value, and are sufficient to commend the work to every teacher of Common Schools.

WM. F. PHELPS.

Albany, May 15, 1846.

*From L. S. PARSONS, A. M., Principal of Albany Female
Academy.*

I have examined Thomson's "First Lessons" in Arithmetic, and am fully of the opinion that it is exceedingly well adapted to the capacities and wants of children.

It begins with the simplest combinations of numbers and very gradually passes to larger ones. The examples refer to sensible objects with which the child is familiar, and the illustrations of the elementary principles of numbers are so lucid that the child cannot fail to comprehend them.

The notes explanatory of the use of the *Numerical Frame* will be found highly useful and acceptable to teachers.

I can heartily recommend the work to the attention of teachers and School committees as admirably fitted to the design of the author and the wants of the learner.

L. S. PARSONS.

Albany, May 14, 1846.

From WILLIAM HOPKINS, A. M. Principal of Auburn Academy.

I have examined Thomson's Primary Arithmetic, and take pleasure in saying that I am much pleased with its plan and execution. The examples are practical and well chosen, the lessons are happily arranged, making the transition from easy combinations of numbers to more difficult ones so gradual as to avoid the common error of passing from simple to abstruse questions before the capacity of the learner is prepared for it, while on the other hand they are sufficiently progressive to awaken his curiosity and stimulate him to exertion. I am persuaded the work is better adapted to the wants of the pupil and the convenience of the teacher, than any other Mental Arithmetic with which I am acquainted.

Auburn, May 26, 1846.

WM. HOPKINS.

From the examination that I have given to Thomson's Primary Arithmetic, I am fully prepared to concur in the above recommendation.

GEO. R. RUDD, Principal of Auburn Female Seminary.

We heartily concur in the above recommendation of Messrs. Hopkins and Rudd.

TERRY EVERSON,
CHAS. P. WILLIAMS,
LEWIS PADDOCK,
W. BOYNTON, Jr.

Teachers of the Public
Schools, Auburn, N. Y.

From REV. J. M. GARFIELD, D. D. Rector of the Albany Female Seminary.

J. C. DERBY, Esq.—Dear Sir, I have examined Thomson's "Mental Arithmetic, or First Lessons in Numbers," lately published by you, and think it sustains the reputation which its well known author has justly acquired by his former mathematical works. I think the work so well adapted to the purposes of juvenile instruction, that I have adopted it as a primary Class book in the Albany Female Seminary. Yours very respectfully,
Albany, May 19, 1846.

J. METCALF GARFIELD.

From E. C. POMROY, Esq., County Superintendent for the Western section of Onondaga Co., N. Y.

J. B. THOMSON, A. M.—Dear Sir,—I have just been examining your "Mental Arithmetic" for children, and it is justly your due for me to say, that I esteem it one of the best things of the kind with which I am acquainted.

The selection, arrangement, and presentation of its matter is very happily designed to attract attention and awaken inquiry on the part of the pupil, while it will assist his memory in retaining the knowledge acquired by the different steps, and lead him to a systematic and consecutive mode of thinking. This habit is of great importance. Your primary Arithmetic is certainly a *treasure* when viewed in this light.

Another excellent feature is, that it begins and ends in just the right places for a work of its kind, and in just the right way.

Knowing you to have been long engaged in promoting the cause of education, and recognizing you as a friend and ornament of the *Teacher's Profession*, you must allow me to subscribe myself,

Yours, with the highest Respect and Esteem,

Otisco, May 20, 1846.

E. C. POMROY.

From C. A. PARSONS, A. M., Town Superintendent of Public Schools, Auburn, N. Y.

JAMES B. THOMSON, Esq.—Dear Sir,—I regard it as indispensable to the pupils success that he should never loose the idea that he is progressing.

Few School Books have perhaps proved more generally useful than Colburn's Mental Arithmetic. Yet Colburn's work has this fault, with classes taking their first lessons in figures. They advance to a certain point when they must be put back and begin anew, for the reason that their capacity cannot grow with the advance so suddenly made from the simple principles of numbers: the operation is repeated until pupils tire and become discouraged in consequence. Nothing can more certainly dampen the warm and curious impulse, with which a child opens upon anything new when rightly presented to him.

I consider your "First Lessons in Numbers" as admirably guarded in this respect, and most cordially recommend them as a *desideratum* much needed in our schools for the use of that class of children for whom they were intended.

Auburn, May 20, 1846.

I am, most truly, Yours,

C. A. PARSONS.

It is believed that children may be profitably instructed in mental arithmetic, as one of their earliest exercises. The works that have been mostly in use, for this purpose, are Colburn's Mental Arithmetic, and Emerson's First Lessons. The former is too difficult for beginners, and is seldom mastered, except by the most gifted of the class. The latter is too puerile, and confines the attention too much to sensible objects. We think Mr. Thomson has avoided the faults of both. His system "commences with practical examples which relate to familiar objects and require the simplest combinations. The pupil is then introduced to others involving the same principle but somewhat harder, special care being taken to make the transition *very gradual*, so that instead of being disheartened at the ruggedness of the way, he shall be stimulated to take the next step by the hope of victory."—*Cayuga Patriot*.

Mr. Thomson has already been very successful as the author of several works of a higher character—and it will be a source of pleasure to many who have become acquainted with his former efforts, to learn of his present work for the young. This, it will be noticed, is intended as comprising the *first lessons in numbers*, and *SIMPLICITY* has therefore been sought in all its rules as well as in all its examples. Every effort seems to have been made to bring all things relating to it down to the youngest capacity. As one example it may be mentioned, owing to the fact that "children comprehend and remember words more easily than figures, and reason upon them with so much greater facility, the numbers and tables in the first part of the book, are expressed in words." Taken as a whole, it is admirably adapted for the class for whose benefit it is specially intended—and we rejoice to learn that it has already been very generally introduced into most of the schools in this vicinity.—*Auburn Daily Advertiser*.

PRACTICAL ARITHMETIC.

From Prof. V. DREW, A. M. Prin. of Eng. and Classical Institute, N. Y. City—to PROF. WEST, Principal of Rutgers Institute, New York.

Dear Sir,—By request of the publishers, I present you a copy of "Thomson's Practical Arithmetic"—a work which I have just adopted in school. My rule has been, not to recommend a book which I have not fully tested by use: but, in the present case, I must say, from a fair examination, I consider this Arithmetic as decidedly the best that has appeared. In nearly every Article something is gained in the mode of presenting the subject,

perspicuity, and precision being remarkable throughout. Notwithstanding the late improvements in such works, I should not be surprised should this production soon become the general favorite.

New York, May 4, 1846.

V. DREW.

Extract from Rev. SAMUEL J. MAY, late Principal of State Normal School, Lexington, Mass.

JAMES B. THOMSON, Esq.—Dear Sir:—I have given some time to the examination of your "Practical Arithmetic;" and am happy in being able to speak of it in terms of high commendation. The plan is excellent, and the execution of the plan, so far as I have examined, is thorough. It is the best offspring I have yet seen, of the improved method of teaching Arithmetic. Wishing you an ample reward for your labors, in the preparation of books, to assist in the instruction of the young.

I remain your sincere friend,

Syracuse, May 6, 1846.

SAMUEL J. MAY.

From L. W. HALL, A. M. Author of Moral Philosophy, and Principal of Ravenna High School, Ohio.

J. B. THOMSON, Esq.—Dear Sir,—I have derived much satisfaction from an examination of your "Practical Arithmetic," and my appreciation of its merits will be best expressed by the statement of the fact that I intend to introduce it into my school, at the earliest practical moment. Its thoroughly practical character is what gives it great value in my estimation, and in this respect it greatly excels any Arithmetic with which I am acquainted.

Ravenna, Ohio, May 19, 1846.

L. W. HALL.

From Rev. GEO. W. THOMSON, Principal of Onondaga Academy, New-York.

MR. THOMSON—Dear Sir—From the examination I have been able to give your "Practical Arithmetic," I consider it a valuable addition to that class of books. It contains many improvements and items which are not found in other Arithmetics. Your edition of "Day's Algebra," I am also very much pleased with. I shall introduce both of them into my school as soon as possible.

Very respectfully your obedient servant,

Onondaga Academy, May 25, 1846.

GEO. W. THOMSON.

From E. A. SMITH, Esq. Cor. Secretary of Queens Co. Teachers Association, N. Y.

MR. THOMSON—Dear Sir—I recently received from your publishers a copy of the "Practical Arithmetic," of which you are the author. Permit me to express my gratification at the *internal evidence of merit* which it exhibits. The lucid arrangement exceeds any thing of the kind that I have hitherto seen; the progression from simple easy examples to those which are more complex, and especially the illustrations of the different rules by examples drawn from the every day occurrences of life, are all exceedingly well adapted to impart a *real knowledge* of the science of Arithmetic, and are altogether preferable to the mechanical sameness, which has so long prevailed, and which will continue, until the mere abstract expositions are laid aside. The juvenile mind needs tangible objects, familiar examples, which may be grasped without difficulty, and to which the process of reasoning may be successfully applied. Finally, I hope your book may come into general use; and I am satisfied that to be *appreciated* it has only to be seen and examined.

Very truly Yours,

Hemstead, Jan. 31, 1846.

ELIJAH A. SMITH.

Thomson's First Lessons.

MENTAL
ARITHMETIC,
OR
FIRST LESSONS IN NUMBERS.
FOR CHILDREN.

By JAMES B. THOMSON, A. M.

AUTHOR OF PRACTICAL ARITHMETIC, EDITOR OF DAY'S SCHOOL ALGEBRA,
LEGENDRE'S GEOMETRY, &c.

AUBURN:

J. C. DERBY & CO.;
G. H. DERBY & CO., GENEVA, N. Y.
DURRIE & PECK, NEW-HAVEN;
LOOMIS & PECK, PHILADELPHIA.

1846.

~~Educ T~~ Educ T 118. 46.830
~~118. 46. 11~~

1863. c. 118.
118. 46. 11.
George F. H. H. H.
118. 46. 11.

Entered according to Act of Congress, in the year 1846,
BY DURRIE & PECK,
in the Clerk's Office of the District Court of Connecticut.

H. OLIPHANT, PRINTER,
Auburn, N. Y.

PREFACE.

At what precise age a child should begin to go to school, or commence the different studies, it is not our province to decide. Whatever may be the diversity of opinion on this point, all practical teachers seem to agree, that Mental Arithmetic is among the first exercises, which should be presented to the youthful mind. The correctness of this sentiment is corroborated by the ease with which children understand simple combinations of numbers, their fondness for these exercises, and the obvious advantages which may be derived from them. But in order to become interesting or profitable, it is manifest, this branch, as well as others, must be taught in such a manner that the pupil shall understand it. The examples therefore must, at first, be simple, containing small numbers, and have reference to sensible objects with which the learner is acquainted; the transition from easy to more difficult questions must be very gradual; and the reason for every step in the solution distinctly seen.

It is believed that much *dislike* for the study of Arithmetic, and much *unnecessary discouragement*, have been occasioned by the *abruptness* of the transitions from *easy* to *difficult* questions. It is too often forgotten that the powers of the child's mind, like those of his body, are feeble; that while familiar mental exercises which he can comprehend, afford him the highest delight, he turns from intricate questions, which he does not and cannot understand, with indifference and disgust.

It is the design of this little work to furnish a series of mental exercises in numbers, adapted to the wants and capacities of children. It commences with practical examples which relate to familiar objects and require the simplest combinations. The pupil is then introduced to others involving the same principle but somewhat harder, special care being taken to make the transition *very gradual*, so that instead of being disheartened at the ruggedness of the

way, he shall be stimulated to take the next step by the hope of victory.

From the fact that children comprehend and remember *words*, more easily than *figures*, and reason upon them with so much greater facility, the numbers and Tables in the first part of the book, are expressed in words.

After the pupil has become practically acquainted with the principles of a rule and is able to solve questions under it with facility, the operation is then defined, and its more prominent terms are briefly explained. This, it is believed, teachers will be glad to see. There is no reason why a child should not be informed, that a certain operation upon numbers is called Addition; another, Subtraction; &c., as well as to be told that a certain operation of his vocal organs in connection with those of his mind, is called reading; another, singing, &c.

With this brief explanation of the object and plan of the work, the author commends it to the friends of education by whom his former efforts to subserve this noble cause, have been so favorably received.

Although designed particularly as an introduction to the "Practical Arithmetic," it may be used as a preparatory work to any of the larger systems of Arithmetic now before the public.

MENTAL ARITHMETIC.

SECTION I.

INTRODUCTION.

THE first step in acquiring a knowledge of numbers is to learn to count. Most children are able to repeat the *names* of numbers, *one, two, three, &c.*, before they begin to go to school; but there are fewer who fully *comprehend* the *meaning* of these terms; who perceive, for example, that *eleven* expresses *more* things than *seven*, or *fewer* than *thirteen*. While such is the case, no substantial progress can be made in Arithmetic.

Great pains should therefore be taken to show young pupils, in the outset, *how many* things the name of each number denotes, and to establish in their minds a correct idea of *more* and *less*. Counters, made of round pieces of wood or leather, also beans, kernels of corn, &c., may be used for this purpose; but the most convenient apparatus is the *Numerical Frame*.* The balls upon the wires are more easily arranged and are seen at once by every member of the class, while the liability of falling upon the floor and getting lost, is entirely avoided.

LESSON I.

Having slipped all the balls to the left side, the teacher holds up the Numerical Frame before the class and requests their particular attention.

*Every instructor who is called upon to teach the rudiments of Arithmetic, should be furnished with this useful instrument. It costs but a trifle.

With his pointer he now moves the first ball on the bottom wire to the right side and says, this is *one*, the class repeating it with him. Moving across another on the same wire, he says, this makes *two*, the class repeating it with him as before; moving another, this makes *three*; another still, this makes *four*; and yet another, this makes *five*; and so on up to *ten*.

This process should be repeated and varied according to circumstances, until the class can count *ten* in concert and individually with readiness. If this cannot be accomplished in one exercise, another should be devoted to it.

Note.—If the children are young, or have never learned the names of any of the numbers, when they get to *three* or *five*, it will be expedient to stop and review as far as they have been. Care should be taken not to present too many new ideas to the young mind at once, lest it become bewildered; nor should the exercise be continued so long as to weary it, and thus create a *lasting dislike* for the study.

LESSON II.

Slipping all the balls to the left side of the frame as before, move the first on the lower wire to the right side, and ask the class to count it.

Next move out *two* on the second wire, taking one at a time, and let the class count as you move them, *one, two*. Then pass across *three* on the third wire, taking one at a time, and the class counting, *one, two, three*.

Proceed in this manner to the *tenth* or *last*, increasing one ball on each successive wire.

and, with proper care, will last an age. Its more prominent uses will be pointed out in their proper place.

The lessons in this Section are designed for pupils who have not learned to count, or may not comprehend how many things are denoted by the names of numbers. Those who thoroughly understand these points, can begin with Addition.

Again, beginning at the bottom, let the class count the balls moved out on each wire, and observe that *two* is one more than *one*; that *three* is one more than *two*; that *four* is one more than *three*, &c.

Next, let the class retrace this process; that is, beginning at the top, let them count the balls moved out on each wire till they arrive at the bottom one.

Let them also begin at ten and count *backwards* to one, several times in quick succession. Thus, *ten, nine, eight, seven, six*, &c.

Finally, move out any number of balls under ten promiscuously, and call upon some one to count them; then move out a different number, and let another count them; and thus continue to vary the exercise, till every one in the class can count *ten* understandingly.

LESSON III.

Note.—As soon as the class clearly comprehend *how many* things are expressed by the name of each of the numbers up to *ten*, they are then prepared to learn to count from *ten* to *twenty*, &c.

Having counted out *ten* balls on the lower wire, move across one on the second wire saying, this makes *eleven*, the class repeating it with you. Passing across another, this makes *twelve*; another, this makes *thirteen*; another still, this makes *fourteen*; and so on up to *twenty*.

Repeat this process, at the same time explaining to the class that the name *thirteen*, is composed of the words *three* and *ten*, and means the same as *three* counted on to *ten*, or *three* and *ten* put together. Also, that the name *fourteen* is composed of the words *four* and *ten*, and means the same as *four* and *ten* put together; that *fifteen* means *five* and *ten*;

sixteen, six and ten ; seventeen, seven and ten ; eighteen, eight and ten ; nineteen, nine and ten ; and twenty means two tens.

Next, having counted off twenty balls ; that is, ten apiece on each of the two lower wires, passing across one on the next wire, say, this makes *twenty-one*, the class repeating it with you as before. Passing across another, this makes *twenty-two* ; another, this makes *twenty-three* ; another still, this makes *twenty-four* ; and so on to *thirty*.

Here again the teacher should be careful to explain that the name *twenty-one* is composed of the words *twenty* and *one*, and means the same as *one* counted on to *twenty*, or *twenty* and *one* put together. Also, that the name *twenty-two* is composed of the words *twenty* and *two*, and means the same as *twenty* and *two* put together ; that *twenty-three* means *twenty* and *three* ; &c.

In a similar manner children may be easily taught to count from thirty to forty, fifty, sixty, &c., to a hundred, and to comprehend *how many* things are expressed by the name of each number.

SECTION II.

ADDITION.

LESSON I.

1. How many little *boys* are there in this class?*
2. How many little *girls* are there?
3. How many little girls and boys are there, counted together?

4. Will each of you show me your *right* hand? Now if you put your *left* hand by the side of it, how many hands will each one show me? Why?

Ans. Because *one* and *one* more make *two*.

5. If you show me *two* fingers on your left hand and *one* on your right, how many fingers will you show me? Why?

Ans. Because *two* and *one* more make *three*.

6. If you open *three* fingers on your left hand and *one* on your right, how many fingers will you have open? Why?

7. How many *fingers* have you on your right hand? How many *thumbs*? How many *fingers* and *thumbs* counted together, are there on your right hand?

*When a general question is asked which is not designed to be answered in concert, it is an excellent way to have all who think they know, raise a hand; then call upon some one promiscuously to answer it. This method prevents much confusion and secures the attention, while it effectually avoids the temptation to learn the answers to certain questions which will fail to each, if the teacher always begins at the same end of the class and proceeds through it in regular rotation.

8. If I move out *five* balls on the lower wire of my Numerical Frame and *one* on the next, how many will they all make? Why?

9. If I move out *six* on the lower wire and *one* on the next, how many will they make? Why?

10. If I move out *seven* on the lower and *one* on the next, how many will they make? Why?

11. If I move out *eight* on the lower and *one* on the next, how many will they make?

12. If I move out *nine* on the lower and *one* on the next, how many will they make?

Note.—As soon as a child learns a principle in Arithmetic, it is important for him to see its application, and begin to practice it. For this reason, it is recommended to let the class study the next eight lessons in connection with the corresponding parts of the Table below. Thus, as soon as they learn to add *ones*, let them take lesson *second* which contains exercises in adding two; as soon as they learn to add *threes*, let them take lesson *third*, &c. In this way the Table is kept together, which is essential for reference and review, and at the same time we secure all the advantages of studying it in connection with examples which put it into practice, as fast as it is learned.

ADDITION TABLE.

One and one are two.
One and two are three.
One and three are four.
One and four are five.
One and five are six.

One and six are seven.
One and seven are eight.
One and eight are nine.
One and nine are ten.
One and ten are eleven.

Two and one are three.
Two and two are four.
Two and three are five.
Two and four are six.
Two and five are seven.

Two and six are eight.
Two and seven are nine.
Two and eight are ten.
Two and nine are eleven.
Two and ten are twelve.

Three and one are four.
Three and two are five.
Three and three are six.
Three and four are seven.
Three and five are eight.

Three and six are nine.
Three and seven are ten.
Three and eight are eleven.
Three and nine are twelve.
Three and ten are thirteen.

Four and one are five.
 Four and two are six.
 Four and three are seven.
 Four and four are eight.
 Four and five are nine.

Four and six are ten.
 Four and seven are eleven.
 Four and eight are twelve.
 Four and nine are thirteen.
 Four and ten are fourteen.

Five and one are six.
 Five and two are seven.
 Five and three are eight.
 Five and four are nine.
 Five and five are ten.

Five and six are eleven.
 Five and seven are twelve.
 Five and eight are thirteen.
 Five and nine are fourteen.
 Five and ten are fifteen.

Six and one are seven.
 Six and two are eight.
 Six and three are nine.
 Six and four are ten.
 Six and five are eleven.

Six and six are twelve.
 Six and seven are thirteen.
 Six and eight are fourteen.
 Six and nine are fifteen.
 Six and ten are sixteen.

Seven and one are eight.
 Seven and two are nine.
 Seven and three are ten.
 Seven and four are eleven.
 Seven and five are twelve.

Seven and six are thirteen.
 Seven and seven are fourteen.
 Seven and eight are fifteen.
 Seven and nine are sixteen.
 Seven and ten are seventeen.

Eight and one are nine.
 Eight and two are ten.
 Eight and three are eleven.
 Eight and four are twelve.
 Eight and five are thirteen.

Eight and six are fourteen.
 Eight and seven are fifteen.
 Eight and eight are sixteen.
 Eight and nine are seventeen.
 Eight and ten are eighteen.

Nine and one are ten.
 Nine and two are eleven.
 Nine and three are twelve.
 Nine and four are thirteen.
 Nine and five are fourteen.

Nine and six are fifteen.
 Nine and seven are sixteen.
 Nine and eight are seventeen.
 Nine and nine are eighteen.
 Nine and ten are nineteen.

LESSON LI.

1. If a pear costs *two* cents; and an apple costs *one* cent, how many cents will they both cost?—
Why?*

2. Charles had *two* books, and his father gave him *two* more: how many books did he then have?—

Why?

3. Robert brought in *three* sticks of wood and George *two* sticks: how many sticks did both boys bring in. Why? #

4. Let each one in the class open *all* his fingers on his left hand and *two* on his right: how many fingers has each one open? How many are four and two?

5. Sarah had *five* dresses, and on her birthday her aunt gave her *two* more: how many dresses had she then? Why? #

6. In this class there are *two* girls and *six* boys: how many scholars does the class contain?

7. John has *seven* brothers and *two* sisters: how many brothers and sisters has he together?

8. A little boy gave a blind man *eight* cents and his sister gave him *two* cents: how many cents did they both give him?

9. William has *two* marbles in his hand and *nine* in his pocket: how many marbles has he in all?

10. Mary recited *two* perfect lessons last week and

*The process of adding and the structure of the Table may be easily illustrated by the Numerical Frame. Thus, to show that five and four make nine, move out five balls on one wire and four on another, and let the pupil count them together. But as soon as the pupil understands the principle of the operation, he should then learn to perform it without the assistance of visible objects. Nothing is more deleterious to mental growth and discipline, than the habit of solving questions by counters, by the fingers, marks upon a slate, &c. &c.

ten this week : how many perfect lessons has she recited in two weeks ?

LESSON III.

1. If you pay *three* cents for a pint of nuts and *one* cent for an apple, how many cents do you pay for both ? Why ?

2. Henry has *three* young doves and *two* old ones : how many doves has he ? Why ?

3. A beggar met some generous little boys, one of whom gave him *four* cents and another gave him *three* cents : how many cents did they both give him ? Why ?

4. Susan bought *three* yards of blue ribbon and *three* yards of white : how many yards of ribbon did she buy in all ? Why ?

5. Harriet gave her teacher *five* pinks and *three* roses : how many flowers did she give her teacher ? Why ?

6. Matthew sold a quart of chestnuts for *six* cents and a pint of beechnuts for *three* cents : how much did his nuts come to ?

7. Henry picked *three* ripe peaches from one tree and *seven* from another : how many peaches did he pick from both trees ?

8. Frank has *nine* walnuts in his pocket, and he lost *three* coming to school : how many had he when he started from home ?

9. How many are eight and three ?

10. Jane read *ten* pages of history in the morning and *three* in the afternoon : how many pages did she read during the day ?

Note.—It is advisable to have the class review the preceding part of the table, and thus continue to do at every recitation, till they get through it.

LESSON IV.

1. Joseph received *four* peaches from his cousin and *one* from his sister : how many peaches had he ?

2. A boy paid *four* cents for an orange and *two* cents for a lemon : how much did he pay for both ?

3. Emily bought a yard of silk for *five* shillings, and a pair of gloves for *four* shillings : how many shillings did she pay for both ?

4. Dick's father gave him *six* marbles, and he gained *four* more : how many had he then ?

5. Henry gave *four* cents for a lemon, and *four* cents more for an orange : how many cents did he give for both ?

6. A farmer gave *four* dollars for a hog, and *eight* dollars for a cow : how much did he pay for both ?

7. How many are four and three ?

8. A market boy sold *four* shillings worth of milk, and vegetables to the amount of seven shillings : how much money did he have to carry home ?

9. James gave *four* shillings for a knife, and *nine* shillings for a pair of skates : what did he pay for both ?

10. Henrietta bought a slate for *ten* cents, and a sponge for *four* cents : how much did she pay for both ?

LESSON V.

1. A man bought a plough for *five* dollars, and a shovel for *two* dollars : how many dollars did he pay for both ?

2. A farmer raised *three* bushels of plums on one tree and *five* bushels on another : how many bushels did he raise on both trees ?

3. A man sold a bushel of plums for *five* dollars and a bushel of peaches for *four* dollars : how much did both come to ?

4. A man paid *five* shillings for a turkey and *five* shillings for a peck of peas : how much did he pay for both ?

5. There are *six* sweet apples and *five* sour ones in the fruit dish : how many apples does the dish contain ?

6. A cabinet maker asks *five* dollars for a rocking chair and *seven* dollars for a table : what is the price of both ?

7. A man caught *eight* red squirrels and *five* grey ones : how many did he catch in all ?

8. If I pay *five* shillings postage on letters and *nine* shillings on pamphlets, what is the amount of my postage ?

9. Harriet bought a comb for *ten* cents and a paper of needles for *five* cents : how much did she pay for both ?

LESSON VI.

1. Charlotte picked *six* white roses and *two* red ones : how many roses did she pick ?

2. Her brother gave her *three* raisins for her red roses and *six* for her white ones : how many raisins did she get for them ?

3. How many are *six* and *six* ?

4. How many are *six* and *five* ?

5. How many are *six* and *four* ?

6. If you read *six* pages in the morning and *seven* in the evening, how many pages will you read in a day ?

7. John hoed *eight* rows of corn in one day and *six* in another day : how many rows did he hoe in both days ?

8. His employer gave him *nine* pence for his first day's work, and *six* pence for the second day's work : how many pence did John receive ?

9. A lady bought a muff for *ten* dollars and a hat for *six* dollars : what was the amount of her bill ?

LESSON VII.

1. Sarah had *seven* pins on her cushion and she afterwards found *two* more : how many pins had she then ?

2. How many are *seven* and *three* ?

3. If *seven* flower pots stand in one window and *four* in another, how many are there in both windows ?

4. How many are *seven* and *five* ?

5. How many are *seven* and *six* ?

6. How many are *seven* and *seven* ?

7. Oliver paid *seven* cents for a writing book and *eight* cents for a slate : how much did he pay for both ?

8. How many are *seven* and *nine* ?

9. How many are *seven* and *ten*.

LESSON VIII.

1. If a barrel of flour costs *eight* dollars and a keg of lard *two* dollars, how much will both cost ?

2. A merchant tailor asks *eight* dollars for a pair of pants and *three* dollars for a vest : what is the price of both ?

3. If you pay *eight* cents a mile for the use of a horse and *five* cents for a buggy, how much do you pay a mile for both?

4. How many are *eight* and *four*?

5. Julius gave one of his companions *six* apples and had *eight* left: how many had he at first?

6. A shop keeper sold *eight* yards of satin to one lady and *seven* to another: how many did he sell to both?

7. Henry had *eight* marbles and his brother gave him *eight* more: how many did he then have?

8. Catharine's book has *eight* pictures in it and Mary's has *nine*: how many pictures do both books contain?

9. If you pay *eight* cents for a pound of sugar and *ten* cents for a pound of figs, what must you pay for both?

LESSON IX.

1. There are *nine* shade trees standing in front of the school house and *two* have died: how many trees were set out?

2. Alexander's kite line is now *nine* yards long, by accident he broke off *three* yards: how long was his line at first?

3. How many are *nine* and *four*?

4. How many are *nine* and *five*?

5. If a ton of coal costs *nine* dollars and a cord of wood costs *six* dollars, how much will they both cost?

6. A hunter gave *nine* dollars for a gun and *seven* dollars for a dog: how much did he pay for both?

7. In Margaret's flower garden there are *nine* lady's slippers and *eight* bachelor's buttons : how many flowers has she ?

8. If you have *nine* chestnuts in one pile and *nine* in another, how many will they make if you put them all into one pile ?

9. Sophia wrote *nine* lines at the last exercise and Henrietta wrote *ten* : how many lines did both write ?

LESSON X.*

1. How many are one and ten ? Three and ten ? Six and ten ? Four and ten ? Seven and ten ? Five and ten ? Eight and ten ? Nine and ten ?

2. How many are eleven and ten ? Twenty-one and ten ? Thirty-one and ten ? Forty-one and ten ? Fifty-one and ten ? Sixty-one and ten ? Seventy-one and ten ? Eighty-one and ten ? Ninety-one and ten ?

3. Two and ten ? Twelve and ten ? Twenty-two and ten ? Thirty-two and ten ? Forty-two and ten ? Fifty-two and ten ? Sixty-two and ten ? Seventy-two and ten ? Eighty-two and ten ? Ninety-two and ten ?

4. Three and ten ? Thirteen and ten ? Twenty-three and ten ? Forty-three and ten ? Thirty-three and ten ? Sixty-three and ten ? Eighty-three and ten ? Fifty-three and ten ? Seventy-three and ten ? Ninety-three and ten ?

5. Four and ten ? Fourteen and ten ? Twenty-four and ten ? Fifty-four and ten ? Thirty-four and ten ? sixty-four and ten ? Forty-four and ten ? Eighty-four

*This and the following Lesson should be studied, till the questions can be answered with great facility.

and ten? Seventy-four and ten? Ninety-four and ten?

6. Five and ten? Twenty-five and ten? Fifteen and ten? Seventy-five and ten? Sixty-five and ten? Fifty-five and ten? Forty-five and ten? Ninety-five and ten? Eighty-five and ten?

7. Six and ten? Eight and ten? Twenty-six and ten? Twenty-seven and ten? Seventeen and ten? Sixty-eight and ten? Thirty-six and ten? Fifty-seven and ten? Seventy-six and ten? Eighty-eight and ten?

8. Seven and ten? Twenty-nine and ten? Forty-seven and ten? Thirty-six and ten? Ninety-seven and ten? Seventy-six and ten? Sixty-nine and ten? Seventy-seven and ten? Eighty-seven and ten?

9. Nine and ten? Eighteen and ten? Twenty-nine and ten? Thirty-eight and ten? Sixty-nine and ten? Fifty-eight and ten? Seventy-nine and ten? Forty-nine and ten? Eighty-nine and ten? Ninety-nine and ten?

LESSON XI.

1. How many are twelve and five? Twenty-two and five? Thirty-two and five? Forty-two and five? Fifty-two and five? Sixty-two and five? Seventy-two and five? Eighty-two and five? Ninety-two and five?

2. How many are thirteen and six? Twenty-three and six? Thirty-three and six? Forty-three and six? Seventy-three and six? Fifty-three and six? Eighty-three and six? Sixty-three and six? Ninety-three and six?

3. How many are fourteen and seven? Twenty-four and seven? Forty-four and seven? Thirty-four

and seven ? Fifty-four and seven ? Seventy-four and seven ? Sixty-four and seven ? Eighty-four and seven ? Ninety-four and seven ?

4. How many are fifteen and eight ? Twenty-five and eight ? Sixty-five and eight ? Forty-five and eight ? Seventy-five and eight ? Thirty-five and eight ? Ninety-five and eight ? Eighty-five and eight ?

5. How many are sixteen and nine ? Thirty-six and nine ? Twenty-six and nine ? Forty-six and nine ? Eighty-six and nine ? Sixty-six and nine ? Ninety-six and nine ?

6. How many are seventeen and three ? Twenty-seven and four ? Thirty-seven and five ? Forty-seven and six ? Fifty-seven and seven ? Sixty-seven and eight ? Eighty-seven and nine ?

7. How many are eighteen and two ? Twenty-eight and three ? Thirty-eight and four ? Forty-eight and five ? Fifty-eight and eight ? Sixty-eight and seven ? Seventy-eight and six ?

8. How many are nineteen and nine ? Twenty-nine and eight ? Thirty-nine and seven ? Forty-nine and six ? Fifty-nine and five ? Sixty-nine and four ? Seventy-nine and three ?

9. How many are five, three, two, and one ?

10. How many are six, four, five, and ten ?

11. How many are two, three, six, and four ?

12. How many are three, four, seven, and two ?

13. How many are fifteen, and ten, and seven, and five, and three ?

14. How many are thirteen, and seven, and five, and ten, and four ?

15. How many are sixteen, and four, and three, and seven ?

LESSON XII.

1. A grocer sent me a pound of tea worth seven shillings, a gallon of molasses worth three shillings, and a pound of honey worth one shilling : how many shillings did they all amount to ?

2. How many are ten, and four, and two ?

3. How many are seven, and five, and three ?

4. How many are six, and three, and two, and one ?

5. Charles bought a pound of raisins for ten cents, a quart of strawberries for six cents, and a stick of candy for one cent : what was the cost of all ?

6. One of Samuel's hens has six chickens, another has seven, and the other three : how many chickens has he in all ?

7. In my walk this morning I saw nine wild geese in one flock, eight in another, and five in another : how many wild geese did I see ?

8. Six, and five, and three are how many ?

9. Seven, and six, and four are how many ?

10. Ten, and seven, and three are how many ?

11. Horatio paid ten cents for a pen knife, ten cents for a slate, five cents for an inkstand, and one cent for a pencil : how many cents did he pay for all ?

12. A man paid fifteen dollars for a cow, eight dollars for a load of hay, three dollars for a calf, and two dollars for a sheep : how many dollars did he pay for all ?

13. Henry bought a spelling-book for ten cents, an arithmetic for twenty cents, and a slate for nine cents : how much did he pay for all ?

14. Twenty, and ten, and seven, and three, and five are how many ?

LESSON XIII.

1. In what does the solution of the preceding examples in this section, consist?

Ans. It consists in *uniting two or more numbers* together.

2. What is the process of uniting two or more numbers together, called?

Ans. It is called **ADDITION**.

3. When we add two or more numbers together, what is the number which we obtain, called?

Ans. The **SUM** or **AMOUNT**.

4. When we say *five* and *four* are *nine*; which of these numbers is the *sum* or *amount*?

Ans. The number *nine*.

5. What is the sum of six, and four, and two?

Solution. Six and four are ten, and two are twelve. *Ans.* Twelve.

6. What is the sum of five, and three, and one?

7. What is the sum of eight, and four, and three?

8. What is the sum of ten, and five, and two?

9. What is the sum of twenty, and six, and four?

10. What is the sum of thirty-one, and ten, and six?

11. What is the sum of twenty-seven, and three, and one?

12. What is the sum of forty-three, and four, and ten?

13. What is the sum of fifty-four, and five, and nine?

14. What is the sum of seventy-two, and three, and five?

15. What is the sum of sixty-eight, and ten, and two, and five?

EXAMPLES FOR PRACTICE.

1. It cost a traveler ten shillings a day for his board, seven shillings for his horse, and three shillings for incidental expenses : how much were his daily expenses ?

2. If one little girl should give me seven roses, another five tulips, and another four pinks, how many flowers should I have ?

3. How many are three, and seven, and four ?

4. How many are six, and four, and five ?

5. How many are eight, and four, and two ?

6. A man bought a pound of sugar for ten cents, a pound of raisins for eight cents, and a pound of butter for six cents : what was the cost of all ?

7. Henry bought a quart of cherries for eight cents, an orange for three cents, and an ounce of peppermints for six cents : how much did he pay for all ?

8. Five, and three, and seven, and one, are how many ?

9. Six, and two, and seven, and three, are how many ?

10. Three, and nine, and seven, and two, are how many ?

11. Harry bought a pound of raisins for ten cents, a pound of figs for 15 cents, and an orange for five cents : what did they all amount to ?

12. Louisa gave twenty cents for her slate, ten cents for her writing book, six cents for a bunch of quills, and three cents for some pencils : what did she pay for all ?

13. How many are four, and five, and one ? Six, and seven, and three ? Three, and eight, and four ? Six, and ten, and five ? Ten, and eight, and three ?

14. How many are eight, and two, and four? Six, and one, and two? Seven, and four, and ten? Nine, and ten, and five?

15. A farmer sold a cow for eleven dollars, a calf for four dollars, and a sheep for three dollars: how much did he receive for all?

16. A gentleman had several apple trees in his garden; from one he gathered seven bushels, from another ten, and from another five bushels: how many bushels did he gather from all?

17. Dick bought a knife for twenty-five cents, and sold it for five cents more than he gave for it: how much did he sell it for?

18. A man bought a sleigh for thirty dollars, and paid seven dollars to have it painted; he afterwards sold it for forty dollars: did he gain or lose by the bargain? How much?

19. A farmer bought a cart for thirty-five dollars, a plough for nine dollars, and a shovel for two dollars: what was the cost of the whole?

20. A man bought a horse for sixty dollars, a saddle for ten dollars, and a bridle for three dollars: how much did he pay for all?

21. William bought a geography for seventy-five cents, a slate for ten cents, a sponge for three cents, and a lead pencil for two cents: what was the amount of his purchase?

22. A farmer sold a horse and saddle for a hundred and twenty-five dollars, which was ten dollars more than they cost him: what did he pay for them?

SECTION III.

SUBTRACTION.

LESSON I.

1. Suppose I have *two* peaches, if I give away *one* of them, how many shall I have left?

Solution. One peach taken from two peaches, leaves one. *Ans.* One peach.

2. Open *three* fingers on your left hand; now if you shut *one* of them, how many will remain open? *One* taken from three leaves how many?

3. George had *four* marbles in his hand and dropped *one* of them: how many were left in his hand?

Note.—The principle of subtracting one number from another may be easily explained to the pupil by the Numerical Frame. Thus, to show *how many one* taken from *four* will leave, move across four balls, then moving one of them part way back, let the pupil count those that are left.

4. Leonard had *five* cents and gave *one* for a pencil: how many cents has he left? *One* from five leaves how many?

5. Cornelia had *six* apples and gave *one* to her brother: how many has she left?

6. There are *seven* scholars belonging to this class; yesterday *one* of them was absent: how many were present?

7. Martha had *eight* roses, but on her way to school she lost *one*: how many had she left?

8. If you have *ten* apples, and give away *one* of them, how many would you have left?

SUBTRACTION TABLE.

Note.—It is advisable for the pupil to study this Table in the same manner as he did the Addition Table. (*See Note, p. 10.*)

One from one	leaves nought	One from six	leaves five.
One from two	“ one.	One from seven	“ six.
One from three	“ two.	One from eight	“ seven.
One from four	“ three.	One from nine	“ eight.
One from five	“ four.	One from ten	“ nine.

Two from two	leaves nought.	Two from seven	leaves five.
Two from three	“ one.	Two from eight	“ six.
Two from four	“ two.	Two from nine	“ seven.
Two from five	“ three.	Two from ten	“ eight.
Two from six	“ four.	Two from eleven	“ nine.

Three from three	leaves nought.	Three from eight	leaves five.
Three from four	“ one.	Three from nine	“ six.
Three from five	“ two.	Three from ten	“ seven.
Three from six	“ three.	Three from eleven	“ eight.
Three from seven	“ four.	Three from twelve	“ nine.

Four from four	leaves nought.	Four from nine	leaves five.
Four from five	“ one.	Four from ten	“ six.
Four from six	“ two.	Four from eleven	“ seven.
Four from seven	“ three.	Four from twelve	“ eight.
Four from eight	“ four.	Four from thirteen	“ nine.

Five from five	leaves nought.	Five from ten	leaves five.
Five from six	“ one.	Five from eleven	“ six.
Five from seven	“ two.	Five from twelve	“ seven.
Five from eight	“ three.	Five from thirteen	“ eight.
Five from nine	“ four.	Five from fourteen	“ nine.

Six from six	leaves nought.	Six from eleven	leaves five.
Six from seven	“ one.	Six from twelve	“ six.
Six from eight	“ two.	Six from thirteen	“ seven.
Six from nine	“ three.	Six from fourteen	“ eight.
Six from ten	“ four.	Six from fifteen	“ nine.

Seven from seven leaves nought.	Seven from twelve leaves five.
Seven from eight " one.	Seven from thirteen " six.
Seven from nine " two.	Seven from fourteen " seven.
Seven from ten " three.	Seven from fifteen " eight.
Seven from eleven " four.	Seven from sixteen " nine.

Eight from eight leaves nought.	Eight from thirteen leaves five.
Eight from nine " one.	Eight from fourteen " six.
Eight from ten " two.	Eight from fifteen " seven.
Eight from eleven " three.	Eight from sixteen " eight.
Eight from twelve " four.	Eight from seventeen " nine.

Nine from nine leaves nought.	Nine from fourteen leaves five.
Nine from ten " one.	Nine from fifteen " six.
Nine from eleven " two.	Nine from sixteen " seven.
Nine from twelve " three.	Nine from seventeen " eight.
Nine from thirteen " four.	Nine from eighteen " nine.

LESSON II.

1. William had two apples when he started from home, and has given two away: how many has he now? Two from two leaves how many?

2. Eliza had four cents, and has spent two of them for candy: how many cents has she left?

Note—The pupil should think what number added to two makes four, and that will be the number of cents she now has.

3. There were three doves upon the roof of a barn, but two of them have flown away: how many remain upon the roof? Two from three leaves how many? One from three leaves how many?

4. Marbles were formerly five cents a dozen, but now they are two cents cheaper: what do they now cost a dozen? Two and what number make five? Three from five leaves how many?

5. Joseph having seven cents, gave two of them

for a peach : how many cents had he left ? Two and what number make seven ? Five from seven leaves how many ?

6. A boy bought six tumblers, and broke two of them in carrying them home : how many whole ones were left ? Two and what number make six ? Four from six leaves how many ?

7. Formerly there were nine shade trees in front of the school house, but two have been cut down : how many remain ?

8. There are eight scholars in the Geography class ; two of them missing their lesson, were detained : how many were permitted to take their seats ?

9. A boy having ten rabbits, lost two of them : how many had he left ? Two and what number make ten ? Eight from ten leaves how many ?

LESSON III.

1. Edwin had three oranges, and gave each of his three sisters one apiece : how many had he left ? Three from three leaves how many ?

2. If Edwin had four oranges, and should give away three, how many would he have left ? Three from four leaves how many ?

3. A boy was sent to buy six eggs, by carelessness he broke three of them : how many whole ones had he left ? Three and what number make six ?

4. A man put five cows in a pasture, but three of them jumped out : how many remained in the pasture ?

5. Louisa having seven shillings, gave three of

them for a pair of gloves : how many shillings had she then ?

6. Frank had nine chickens, but three of them were killed by the hawks : how many had he left ?

7. Eight boys were permitted to go out, but only three of them chose to go : how many staid in school ?

8. Eleven boys were called up to be punished for bad conduct, all but three of them confessed and were pardoned : how many escaped the punishment ?

9. Julia finding ten roses on her bush, picked off three : how many remained on the bush ?

10. There were twelve peaches in a fruit basket, three of them had begun to decay : how many sound ones were there ?

LESSON IV.

1. Joseph having five lemons, gave four of them for a knife : how many had he left ?

2. There were seven chairs in a school room, four of which were broken : how many whole ones were there ?

3. Mary having six pears, gave four of them to her brothers : how many had she left ?

4. On a training day, nine boys formed themselves into a military company, four of them were officers and the remainder were privates : how many privates were there ?

5. John made eight marks on his slate, and then rubbed out four of them : how many marks remained ?

6. A pound of sugar is worth ten cents and a

quart of vinegar is worth four cents : how much more is the sugar worth than the vinegar ?

7. Lucretia had twelve flower pots standing in the window, and four of them fell out : how many remained in the window ?

8. Edward exchanged his kite worth eleven cents for an inkstand worth four cents, and received the balance in money : how much money did he receive ?

9. William gave thirteen cents for a slate and four cents for a sponge : how much more did his slate cost than his sponge ?

10. There are fourteen pages in Henrietta's writing book, and she has written four of them : how many pages remain to be written ?

LESSON V.

1. If an orange costs six cents and a lemon five cents, how much more does an orange cost than a lemon ?

2. A man having bought eight yards of cloth, used five yards to make a suit of clothes : how many yards had he left ?

3. Frank has seven marbles and John has five : how many more marbles has Frank than John ?

4. A man bought a cow for ten dollars, and gave a barrel of flour worth five dollars; and paid the rest in money : how much money did he pay ?

5. If a bushel of wheat costs nine shillings and a bushel of corn five shillings, what is the difference in their price ?

6. A man bought a quantity of butter for twelve dollars, but finding it damaged sold it for five dol-

lars less than he gave for it: for how much did he sell it?

• 7. If you had eleven dollars and should pay five dollars for a hat, how many dollars would you have left?

8. John answered thirteen questions and Peter only five: how many more questions did John answer than Peter?

9. A trader bought a keg of tobacco for fourteen dollars, and sold it for five dollars less than he gave: how much did he sell it for?

LESSON VI.

1. There were seven passengers in a stage, six of whom got out: how many were left in the stage?

2. George bought nine quills and used up six of them in a week: how many had he left?

3. A boy having eight cents, bought six cents worth of figs: how many cents had he left?

4. Jane having eleven walnuts, cracked six of them: how many whole ones has she?

5. Moses sold his knife for ten cents, which was six cents more than he gave for it: how much did it cost him?

6. A writing book costs thirteen cents, and an inkstand six cents: how much more must I pay for a writing book than an inkstand?

7. Harriet bought twelve knots of yarn, and used six knots in knitting herself a pair of stockings: how many knots had she left?

8. During the last fourteen days it has rained six days: how many fair days have there been? Eight from fourteen leaves how many?

9. A water-melon costs fifteen cents and a musk-melon six cents : what is the difference in their prices ?

LESSON VII.

1. Sarah had eight pins, but she has lost seven of them : how many has she left ?

2. Catharine having a present of nine peaches, gave away seven of them, and kept the remainder : how many did she keep ?

3. Seven from eleven leaves how many ? Four from eleven leaves how many ?

4. A merchant had ten yards of cloth in a piece, and sold seven yards of it : how many yards were left ?

5. If you had twelve apples and should give away seven of them, how many would you have left ?

6. John had thirteen marbles and lost seven of them at play : how many had he left ?

7. A farmer drove fourteen sheep to market and could sell only seven of them : how many had he left ?

8. Seven from sixteen leaves how many ? Nine from sixteen leaves how many ?

9. A man bought a keg of molasses containing fifteen gallons, and having used a quantity of it, found he had seven gallons left : how much had he used ?

10. There were seventeen caps hung up in the entry, but during recess seven of them were knocked down : how many of them were left hanging ? Ten from seventeen leaves how many ?

LESSON VIII.

1. Frank bought a book for eight cents and sold it for eleven cents : how much did he make by his bargain ?

2. A lady bought a dress for eight dollars and handed the shopkeeper a ten dollar bill : how much change ought she to receive back ?

3. John bought a sled for nine cents and paid eight cents down : how many cents does he still owe for it ?

4. There are twelve weeks in a quarter, and eight of them are past : how many weeks before the quarter will end ?

5. Eight from fifteen leaves how many ? Seven from fifteen, how many ?

6. Eight from thirteen leaves how many ? Five from thirteen, how many ?

7. Margaret's vacation is fourteen days long, and she has been at home eight days : how many days before she must return to school ? Eight from fourteen leaves how many ?

8. A boy having sixteen oranges in his basket, sold eight of them to the railroad passengers : how many has he left ?

9. A little girl went a shopping with seventeen cents in her purse, and on her return, found she had eight cents left : how much did she spend ? Eight from seventeen leaves how many ?

10. A man selling a cow for eighteen dollars, took eight dollars in goods and the rest in money : how many dollars did he receive ? Eight from eighteen leaves how many ?

LESSON IX.

1. If you buy a pound of sugar for nine cents, and give the shopkeeper a ten cent piece, how much change ought he to give you?

2. In the Algebra class there are twelve scholars, and nine of them recited their lesson perfectly: how many failed? Three from twelve leaves how many?

3. Susan has eleven pinks and nine tulips: how many tulips must she receive to make them equal in number to her pinks? Two from eleven leaves how many?

4. Harriet's age is thirteen years, and Lucy's is nine years: how much older is Harriet than Lucy? Four from thirteen leaves how many?

5. Nine from fifteen leaves how many? Six from fifteen, how many?

6. Nine from fourteen leaves how many? Five from fourteen, how many?

7. Albert has sixteen plums and James nine: how many must James receive to make his number equal to that of Albert?

8. A merchant bought a quantity of beef at seventeen dollars a barrel, and finding it damaged, sold it for nine dollars a barrel: how much did he lose on a barrel?

9. William had eighteen cents in his pocket, and on his way to school he spent nine of them: how many cents has he left?

10. In school street there are nineteen shade trees, nine of which are ~~oaks~~, and the rest are maples: how many maple trees are there?

LESSON X.*

1. One from ten leaves how many? One from twenty? One from thirty? One from forty? One from seventy? One from sixty? One from eighty? One from fifty? One from ninety? One from a hundred?

2. Two from ten leaves how many? Two from twenty? Two from thirty? Two from forty? Two from sixty? Two from eighty? Two from fifty? Two from seventy? Two from ninety? Two from a hundred?

3. Four from ten leaves how many? Four from twenty? Four from thirty? Four from sixty? Four from forty? Four from fifty? Four from ninety? Four from seventy? Four from eighty? Four from a hundred?

4. Three from a hundred leaves how many? Three from ninety? Three from eighty? Three from seventy? Three from sixty? Three from fifty? Three from forty? Three from thirty? Three from twenty? Three from ten?

5. Five from a hundred leaves how many? Five from ninety? Eighty? Seventy? Sixty? Fifty? Forty? Thirty? Twenty?

6. Six from fourteen leaves how many? Six from Twenty? Thirty? Fifty? Forty? Sixty? Eighty? Ninety? Seventy? A hundred?

7. Seven from ten leaves how many? Seven from Twenty? Forty? Thirty? Seventy? Sixty? Eighty? Fifty? Ninety? A hundred?

*The pupil should be able to answer the questions in this and the following Lesson, with readiness, before he proceeds to the next.

8. Eight from ten leaves how many ? Eight from twenty ? Thirty ? Fifty ? Forty ? Sixty ? Eighty ? Seventy ? Ninety ? A hundred ?

9. Nine from ten leaves how many ? Nine from twenty ? Forty ? Eighty ? Ninety ? Seventy ? Fifty ? Sixty ? Thirty ? A hundred ?

LESSON XI.

1. Ten from twelve leaves how many ? Ten from twenty-three ? Ten from thirty-four ? Ten from forty-five ? Ten from fifty-six ? Ten from sixty-seven ? Ten from seventy-eight ? Ten from eighty-nine ? Ten from a hundred ?

2. Five from twelve leaves how many ? Five from twenty-two ? Five from thirty-two ? Five from sixty-two ? Five from forty-two ? Five from seventy-two ? Five from fifty-two ? Five from eighty-two ? Five from ninety-two ?

3. Three from eight leaves how many ? Three from eighteen ? Three from twenty-eight ? Three from fifty-eight ? Three from forty-eight ? Three from sixty-eight ? Three from thirty-eight ? Three from seventy-eight ? Three from ninety-eight ? Three from eighty-eight ?

4. Four from nine leaves how many ? Four from nineteen ? Four from thirty-nine ? Four from twenty-nine ? Four from sixty-nine ? Four from seventy-nine ? Four from fifty-nine ? Four from forty-nine ? Four from eighty-nine ? Four from ninety-nine ?

5. Six from seventeen leaves how many ? Six from twenty-eight ? Six from fifty-four ? Six from thirty-eight ? Six from eighty-seven ?

6. Seven from twenty-five leaves how many ?

Seven from forty-nine ? Seven from thirty-six ? Seven from sixty-three ? Seven from eighty-four ? Seven from ninety-eight ?

LESSON XII.

1. A man bought a cow for ten dollars, and sold it again for twelve dollars : how much did he make by his bargain ? Ten from twelve leaves how many ? Two from twelve, how many ?

2. Ten from eleven leaves how many ? One from eleven, how many ?

3. William's Arithmetic lesson contained thirteen questions, and he recited ten of them perfectly : how many did he miss ?

4. Charles paid fifteen cents for a knife, and sold it for ten cents : how much did he lose by his bargain ?

5. A robber was sentenced to the State's prison for fourteen years, and after ten years had elapsed he was pardoned out : how many years of his sentence still remained ?

6. A lady went shopping with sixteen dollars in her purse, and having paid ten dollars for a dress, gave the rest for a bonnet : what was the price of the bonnet ?

7. Henry having eighteen canary birds, wishes to keep ten of them and sell the remainder : how many can he sell ?

8. Ten from seventeen leaves how many ? Seven from seventeen, how many ?

9. In an orchard containing nineteen trees, ten of them are apple-trees, and the rest are peach-trees : how many peach-trees are there ?

10. If a horse can go ten miles an hour and a railroad car twenty miles an hour, how many more miles can the car go, than the horse?

LESSON XIII.

1. In what does the solution of the preceding examples of this section, consist?

Ans. It consists in taking a *less* number from a *greater* one.

2. What is the process of taking a less number from a greater, called?

Ans. It is called SUBTRACTION.

3. When we subtract one number from another, what is the *answer*, or number which we obtain, called?

Ans. The DIFFERENCE OR REMAINDER.

4. When we say *eight* from *twelve* leaves *four*, which is the *greater* number? Which is the *less*? Which is the *difference* or *remainder*?

5. What is the difference between nine and fifteen?

Solution. Nine from fifteen leaves six. *Ans.* Six.

6. What is the difference between five and nine?

7. What is the difference between six and thirteen?

8. From twenty subtract seven.

9. From thirty-five subtract six.

10. From fifty-three take ten.

11. From forty-seven take four.

12. From sixty-eight take nine.

13. From eighty-one take five.

14. From one hundred and ten take three.

15. From one hundred and sixty take eight.

LESSON XIV.

EXAMPLES FOR PRACTICE.

1. James gave twelve cents for a quart of cherries, and eight cents for a quart of chestnuts : how much more did he pay for his cherries than for his chestnuts ?
2. A man gave seventeen dollars for a cow, and nine dollars for a load of hay : how much more did he give for the cow than for the hay ?
3. Horace having thirty-six marbles, gave ten to his cousin : how many had he left ?
4. Susan had twenty-four peaches ; she gave six to Harriet, and four to Ann : how many peaches had she left ?
5. On a training day a little boy had fifty cents ; he spent ten cents for pea-nuts, and lost five cents : how many cents had he left ?
6. A man bought a wagon for thirty-six dollars, and sold it for ten dollars less than cost : how much did he get for it ?
7. A merchant bought a hogshead of molasses containing sixty-three gallons, and found that eight gallons had leaked out : how many gallons were left ?
8. A barrel of brandy costs twenty-nine dollars, and a barrel of flour costs six dollars : what is the difference in their price ?
9. The cost of a cloak is forty-five dollars, and the cost of a hat eight dollars : what is the difference in their cost ?
10. A man bought a horse for seventy-five dollars,

and sold it for ten dollars less than he paid: how much did he get for his horse?

11. Samuel is nineteen years old, and his sister is six years younger: how old is she?

12. The cost of an arithmetic is twenty-five cents, and the cost of a slate is twenty cents: what is the difference in their cost?

13. Henry having thirty-six marbles, lost six and gave away five: how many had he left?

14. George having twenty-eight apples, gave three to one companion, two to another, and four to another: how many had he left?

15. A man bought a sleigh for twenty dollars and paid ten dollars for painting it; he then sold it for thirty-two dollars: did he make or lose by the bargain? How much?

16. A man owning forty acres of land, sold twenty acres of it: how many acres had he left?

17. Henry's kite line is fifty yards long, and William's is forty yards long: what is the difference in their length?

18. A farmer having a hundred bushels of wheat, sold fifty bushels: how many bushels had he left?

19. If I have seventy-five cents, and give ten to Charles, six to James, four to Susan, and six to Harriet, how many cents shall I have left?

20. If you have fifty peaches, and give ten to one companion, ten to a second, ten to a third, and ten to a fourth, how many peaches will you have left?

SECTION IV.

MULTIPLICATION.

LESSON I.

1. What will two apples cost, at one cent apiece ?

Suggestion. Two apples will cost *twice* as much as *one* apple ; now if *one* apple costs *one* cent, *two* apples will cost *two times one* cent : and two times one cent are two cents. *Ans.* Two cents.

2. What will two pears cost, at two cents apiece ?

Note.—The learner should be required to give the reasoning in the solution of every example.

3. At three cents a yard, what will two yards of ribbon cost ?

4. At four cents apiece, what will two oranges come to ?

5. George bought five peaches, at two cents apiece: how much did he pay for them ?

6. If one lemon is worth six cents, how many cents are two lemons worth ?

7. What will two muffs cost, at seven dollars apiece ?

8. What cost two quarts of cherries, at eight cents a quart ?

9. At nine cents a pound, what will two pounds of sugar cost ?*

*The principle of *multiplying* cannot be too carefully explained to young pupils. To show them, for example, that *two times ten* are *twenty*, move out ten balls on one of the wires of the Numerical Frame, then move out ten on another wire, and let him count these two *tens* together.

While learning the Multiplication Table, the class may study to advantage the Lessons corresponding with its different parts, as in Addition and Subtraction.

MULTIPLICATION TABLE.

Two times one are two.
 Two times two " four.
 Two times three " six.
 Two times four " eight.
 Two times five " ten.

Two times six are twelve.
 Two times seven " fourteen.
 Two times eight " sixteen.
 Two times nine " eighteen.
 Two times ten " twenty.

Three times one are three.
 Three times two " six.
 Three times three " nine.
 Three times four " twelve.
 Three times five " fifteen.

Three times six are eighteen.
 Three times seven " twenty-one.
 Three times eight " twenty-four.
 Three times nine " twenty-sev.
 Three times ten " thirty.

Four times one are four.
 Four times two " eight.
 Four times three " twelve.
 Four times four " sixteen.
 Four times five " twenty.

Four times six are twenty-four.
 Four times seven " twenty-eight.
 Four times eight " thirty-two.
 Four times nine " thirty-six.
 Four times ten " forty.

Five times one are five.
 Five times two " ten.
 Five times three " fifteen.
 Five times four " twenty.
 Five times five " twenty-five.

Five times six are thirty.
 Five times seven " thirty-five.
 Five times eight " forty.
 Five times nine " forty-five.
 Five times ten " fifty.

Six times one are six.
 Six times two " twelve.
 Six times three " eighteen.
 Six times four " twenty-four.
 Six times five " thirty.

Six times six are thirty-six.
 Six times seven " forty-two.
 Six times eight " forty-eight.
 Six times nine " fifty-four.
 Six times ten " sixty.

Seven times one are seven.
 Seven times two " fourteen.
 Seven times three " twenty-one.
 Seven times four " twenty-eight.
 Seven times five " thirty-five.

Seven times six are forty-two.
 Seven times seven " forty nine.
 Seven times eight " fifty-six.
 Seven times nine " sixty-three.
 Seven times ten " seventy.

Eight times one are eight.	Eight times six are forty-eight.
Eight times two " sixteen.	Eight times seven " fifty-six.
Eight times three " twenty-four.	Eight times eight " sixty-four.
Eight times four " thirty-two.	Eight times nine " seventy-two.
Eight times five " forty.	Eight times ten " eighty.
Nine times one are nine.	Nine times six are fifty-four.
Nine times two " eighteen.	Nine times seven " sixty-three.
Nine times three " twenty-sev.	Nine times eight " seventy-two.
Nine times four " thirty-six.	Nine times nine " eighty-one.
Nine times five " forty-five.	Nine times ten " ninety.
Ten times one are ten.	Ten times six are sixty.
Ten times two " twenty.	Ten times seven " seventy.
Ten times three " thirty.	Ten times eight " eighty.
Ten times four " forty.	Ten times nine " ninety.
Ten times five " fifty.	Ten times ten " one hundred.

Note.—It is an interesting and profitable exercise for young pupils, to recite tables in concert. But it will not do to depend upon this method alone. It is indispensable for *every scholar* who desires to be *accurate* either in *arithmetic* or *business*, to have the common arithmetical tables *distinctly* and *indelibly* fixed in his mind. Hence, after a table has been repeated by the class in concert, or individually, the Teacher should ask many promiscuous questions, to prevent its being recited mechanically, from a knowledge of the regular increase of numbers.

LESSON II.

1. What will three quarts of strawberries cost, at one shilling a quart?
2. At two cents apiece, what will three lead pencils come to?
3. In one yard there are three feet: how many feet are there in three yards?
4. At four cents apiece, what will three oranges cost?
5. What cost three quarts of milk, at five cents a quart?

6. What cost three ounces of snuff, at six cents an ounce ?

7. At seven cents a pound, what will three pounds of cheese come to ?

8. In one peck there are eight quarts : how many quarts are there in three pecks ?

9. If it requires nine yards of calico to make one dress, how many yards will it require to make three dresses ?

10. A man gave three boys ten apples apiece : how many did he give them all ?

LESSON III.

1. At one dollar a bushel, how much will four bushels of wheat cost ?

2. What cost four lemons, at two cents apiece ?

3. If Frederic obtains four credit marks a day, how many will he have in four days ?

4. What cost four quarts of cider, at three cents a quart ?

5. Jane bought four skeins of sewing silk, at five cents a skein : how much did she pay for them all ?

6. In one week there are seven days : how many days are there in four weeks ?

7. Henry had four class-mates, and gave them six apples apiece : how many did he give to all ?

8. What cost four hats, at nine dollars apiece ?

9. What cost four barrels of flour, at eight dollars a barrel ?

10. At ten dollars a ton, what will four tons of hay cost ?

LESSON IV.

1. At one dollar a yard, what will five yards of silk cost?
2. What cost five lemons, at three cents apiece?
3. My board costs me two dollars a week : what will it amount to in five weeks?
4. A man hired a horse for six cents a mile : how much must he pay for going five miles?
5. Sarah's cloak contains five yards of merino, which cost five shillings a yard : how much did her cloak cost?
6. What cost five pair of boots, at four dollars a pair?
7. Eight quarts make one peck : how many quarts are there in five pecks?
8. If a stage goes seven miles an hour, how far will it go in five hours?
9. At nine cents a pound, what will five pounds of butter cost?
10. What cost five yards of cloth, at ten shillings a yard?

LESSON V.

1. What cost six yards of calico, at one shilling a yard?
2. What cost six oranges, at three cents apiece?
3. There are four weeks in a month : how many weeks are there in six months?
4. What cost six yards of cloth, at two dollars a yard?
5. What cost six spools of cotton, at five cents a spool?

6. At seven cents a pound, what will a quarter of lamb weighing six pounds, come to ?

7. What cost six quarts of plums, at ten cents a quart ?

8. Sarah bought six yards of ribbon, at seven cents a yard : how much did she pay for it ?

9. If one inkstand cost six cents, how much will six cost ?

10. What cost six pounds of raisins, at eight cents a pound ?

LESSON VI.

1. Helen's dress contains seven yards of calico, which cost one shilling a yard : what was the cost of her dress ?

2. At three cents a skein, what will seven skeins of sewing silk cost ?

3. At two cents a stick, what will seven sticks of twist cost ?

4. The fare by Railroad from Boston to Albany is six dollars for one person : what will it be for a family of seven persons ?

5. Four farthings make one penny : how many farthings are there in seven pence ?

6. If a stage runs five miles in one hour, how far will it run in seven hours ?

7. Harriet had seven rose bushes, and one morning she found eight roses upon each : how many were there upon all ?

8. What cost seven pounds of lard, at seven cents a pound ?

9. What cost seven dozen chairs, at nine dollars per dozen ?

10. At ten shillings a yard, what is the cost of seven yards of cloth ?

LESSON VII.

1. What will eight bushels of peaches cost, at one dollar a bushel?

2. If a quart of milk costs four cents, what will be the cost of eight quarts?

3. If you recite three perfect lessons a day, how many will you recite in eight days?

4. At two shillings a gallon, what will eight gallons of molasses come to?

5. In New England, six shillings make a dollar : how many shillings are there in eight dollars?

6. At eight cents a pound, what cost five pounds of figs?

7. There are eight rows of trees in an orchard, and seven trees in a row : how many trees are there in the orchard?

8. In New York, eight shillings make a dollar : how many shillings are there in eight New York dollars?

9. A farmer sold eight tons of hay, at nine dollars per ton : how much did he receive for his hay?

10. What is the value of eight cows, at ten dollars apiece?

LESSON VIII.

1. In one quart there are two pints : how many pints are there in nine quarts?

2. What cost nine caps, at one dollar apiece?

3. Three feet make a yard : how many feet are there in nine yards?

4. A traveler met nine beggars and gave each of them four shillings : how many shillings did he give to all?

5. If a hunter kills five pigeons at every shot, and fires nine times, how many will he kill?

6. How much will nine quarts of blue-berries cost, at eight cents a quart?

7. Henry's mother gave him six cents apiece for carrying nine billets: how many cents did he receive for all?

8. Susan received seven shillings a-week for doing the work of the family: how much did she earn in nine weeks?

9. If a family consumes ten pounds of butter in a week, how many pounds will last them nine weeks?

10. What cost nine cords of wood, at nine shillings a cord?

LESSON IX.

1. How much will ten sheep cost, at two dollars a head?

2. How much will ten barrels of flour cost, at five dollars a barrel?

3. At four dollars a yard, what will ten yards of cloth cost?

4. What cost ten bushels of corn, at three shillings a bushel?

5. What cost ten coats, at eight dollars apiece?

6. A farmer gave three bushels of wheat for a yard of cloth: how many bushels must he give for ten yards?

7. A dairy woman bought ten yards of silk and paid for it in butter, giving seven pounds for a yard: how many pounds of butter did her silk cost?

8. At six dollars a yard, how much will ten yards of cloth cost?

9. Ten dollars make an eagle: how many dollars are there in ten eagles?

10. My neighbor's peach-orchard contains ten rows of trees, and there are nine trees in a row: how many peach-trees has he?

LESSON X.*

1. How many times two make eight? How many times two make twelve? Ten? Fourteen? Eighteen? Sixteen? Twenty?

2. How many times three make twelve? Nine? Fifteen? Twenty-one? Eighteen? Twenty-four? Thirty? Twenty-seven?

3. How many times four make twenty? Sixteen? Twelve? Eight? Twenty-four? Thirty-two? Thirty-six? Forty?

4. How many times five make twenty? Thirty? Twenty-five? Thirty-five? Forty? Forty-five? Fifty?

5. How many times six make eighteen? Thirty? Twenty-four? Forty-two? Thirty-six? Sixty? Forty-eight? Fifty-four?

6. How many times seven make twenty-eight? Thirty-five? Twenty-one? Forty-two? Seventy? Sixty-three? Fifty-six?

7. How many times eight make twenty-four? Thirty-two? Forty-eight? Seventy-two? Forty? Fifty-six? Eighty? Sixty-four?

8. How many times nine make twenty-seven? Forty-five? Thirty-six? Fifty-four? Seventy-two? Sixty-three? Eighty-one? Ninety?

*This and the following lesson should be studied, till the class can answer the questions with great promptitude. This they will soon be able to do, if they have *thoroughly* learned the Multiplication Table.

9. How many times ten make thirty? Twenty? Forty? Sixty? Fifty? Ninety? Eighty? Seventy? One hundred?

LESSON XI.

1. Eight is how many times two? How many times four? How many times one?

Note.—The number *eight*, &c., is considered a collective noun, conveying the idea of *unity*, and therefore requires a *singular* verb.

2. Twelve is how many times two? How many times three? How many times four? How many times six? How many times one?

3. Eighteen is how many times two? How many times six? How many times three? How many times nine?

4. Sixteen is how many times eight? How many times four? How many times two?

5. Twenty is how many times two? How many times five? How many times ten? How many times four?

6. Thirty is how many times five? How many times ten? How many times six? How many times three?

7. Twenty-four is how many times four? How many times three? How many times six? How many times eight? How many times twelve? How many times two?

8. Thirty-two is how many times eight? How many times four?

9. Thirty-six is how many times six? How many times four? How many times three? How many times twelve? How many times nine?

10. Twenty-seven is how many times three? How many times nine?

11. Forty-two is how many times six ? How many times seven ?

12. Fifty-six is how many times seven ? How many times eight ?

13. Thirty-five is how many times seven ? How many times five ?

14. Seventy-two is how many times nine ? How many times eight ?

LESSON XII.

1. What cost five oranges, at three cents apiece ?

2. What cost six thimbles, at four cents apiece ?

3. A teacher bought ten inkstands; at six cents apiece : what did they come to ?

4. If four boys sit on one bench, how many can sit on five benches ? On seven benches ?

5. Jane bought five yards of silk braid, at four cents a yard : how much did it come to ?

6. Horace bought four young rabbits for eight shillings, and sold them for three shillings apiece : did he gain or lose by his bargain ? How much ?

7. What will ten pounds of figs cost, at eight cents a pound ? At nine cents ?

8. When beef is six dollars a hundred, what will a fatted ox come to which weighs nine hundred pounds ?

9. If one stage can carry nine passengers, how many can four stages carry ?

10. What cost nine pounds of tea, at six shillings a pound ?

11. If five yards of cloth will make one cloak, how many yards will six cloaks require ?

12. If a horse travels six miles in an hour, how far will he travel in ten hours ?

LESSON XIII.

1. In what does the solution of the foregoing examples of this Section, consist?

Ans. It consists in the *repeated addition of a given number to itself.*

2. What is this repeated addition of a number to itself, called?

Ans. It is called MULTIPLICATION.

3. What is the number to be *repeated*, or *multiplied*, called?

Ans. The *Multiplicand.*

4. What is the number by which we multiply, called?

Ans. The *Multiplier.*

5. What is the answer, or number produced, called?

Ans. The *Product.*

6. What is meant by the word *product*?

Ans. Something that is *produced* or *formed.*

7. When we say, three times six are eighteen; which is the number to be multiplied? Which is the number to multiply by?

8. When we say, four times five are twenty; which is the answer? What is the *four* called? What is the *five* called? What is the *twenty* called?

9. What is the product of seven multiplied by six?

10. What is the product of nine multiplied by five?

11. What is the product of eight multiplied by six?

12. What is the product of seven times nine? Of eight times eight? Of seven times six?

13. What is the product of eight times seven? Of nine times eight? Of nine times seven? Of six times nine? Of seven times five? Of nine times five? Of seven times ten?

14. Which is the most, three times four, or four times three?

Note.—To illustrate this point, move out four balls on the lower wire, and four apiece on the second and third wires. This will denote three times four, or four added to itself three times, which the pupil will perceive make twelve.

Again, letting these remain in their present place, move out three balls on the upper wire, also three apiece on the next three wires. This will denote four times three, or three added to itself four times, which the pupil will see make twelve, and is therefore the same as three times four.

15. Which is the most, five times three, or three times five?

16. Which is the most, five times six, or six times five? Six times seven, or seven times six?

LESSON XIV.

EXAMPLES FOR PRACTICE.

1. What will six pair of skates cost, at five shillings a pair?

2. What will four caps cost, at eight shillings apiece?

3. How much will nine quarts of cherries come to, at seven cents a quart?

4. At ten dollars apiece, how much will three ploughs cost?

5. A farmer sold nine lambs, at eight shillings apiece: how much did they come to?

6. If a man gives six bushels of oats for one pair

of boots, how many bushels must he give for seven pair of boots?

7. If six men do a piece of work in ten days, how long will it take one man to do it?

8. At seven cents a bunch, how much will eight bunches of radishes cost? Nine bunches? Ten bunches?

9. Which is the most, eight times seven, or nine times six? Six times six, or four times nine? Eight times eight, or seven times nine?

10. A farmer bought six pair of shoes, at two dollars a pair, and paid four cords of wood worth two dollars a cord: how much did he still owe for his shoes?

11. Twenty-eight is how many times seven? How many times four? Sixty-three is how many times nine? Forty-eight is how many times six?

12. Fifty-six is how many times eight? Forty-five is how many times nine? Forty-two is how many times six? Forty-nine is how many times seven?

13. Eighty-one is how many times nine? Forty is how many times ten? Eighty is how many times ten?

14. Which is the most, four times three, or three times four?

15. Which is the most, five times four, or four times five?

16. Which is the most, six times eight, or nine times six?

17. Which is the most, seven times nine, or eight times seven?

18. If side combs cost nine cents a pair, what will five pair cost? Eight pair? Nine pair? Seven pair? Ten pair?

19. What cost nine papers of pins, at two shillings a paper ? At four shillings ?

20. Nine times three are how many ? Nine times four ? Nine times six ?

21. If a barrel of maple sap will make eight pounds of sugar, how many pounds will four barrels make ? Seven barrels ? Eight barrels ?

22. What cost seven penknives, at six shillings apiece ?

23. Edwin bought six pencils and gave two apples apiece for them ; also four quills and gave three apples apiece for them : how many apples did he give for his pencils and quills together ?

24. If one acre of ground produces ten bushels of wheat, how many bushels will six acres produce ? Ten acres ?

25. Seven times six are how many ? Seven times eight ? Seven times nine ? Eight times nine ? Six times nine ?

26. Charlotte bought six primers, at nine cents apiece : what did they come to ?

27. A lady bought ten yards of calico, at ten cents a yard ; and four spools of cotton, at five cents a spool : what did her bill amount to ?

28. A man bought ten sheep, at two dollars a head ; and four cows, at ten dollars a head : how much did he give for all ?

29. Henry bought seven quarts of cherries, at nine cents a quart ; and ten quarts of strawberries, at six cents a quart : which cost the most ?

30. Which will cost the most, nine slates at eight cents apiece, or ten inkstands at seven cents apiece ?

SECTION IV.

DIVISION.

LESSON I.

1. How many pears, at one cent apiece, can you buy for two cents?

Suggestion. Since *one* cent will buy *one* pear, two cents will buy as many pears, as *one* cent is contained times in *two* cents : and one cent is contained in two cents, *two* times. *Ans.* Two pears.

Note.—The reasoning should be given in the solution of every example.

2. At two cents a yard, how many yards of tape can you buy for four cents?

Suggestion. To find how many times *two* cents are contained in *four* cents, the learner must think how many times *two* make *four*.

3. At two cents apiece, how many oranges can be bought for six cents?

4. George bought ten marbles, which he divided among his little brothers, giving them two apiece : how many brothers had he?

Suggestion. Since he gave two marbles to each, he manifestly had as many brothers, as two marbles are contained times in ten marbles.

Note.—The principle of dividing may be illustrated in the following manner : Pass across ten balls on one of the wires, which may represent the ten marbles. Now since he gave two marbles to each brother, moving out two balls will denote one brother ; moving out two more will denote another still ; and so on, every two balls will denote one brother, till all the balls are removed or exhausted. Finally, counting the number of *twos* or pair of balls moved out it will show how many times two marbles are contained in ten marbles, which is the number of brothers he had.

5. How many lead pencils, at two cents apiece, can you buy for eight cents?

6. Henry had twelve shillings which he laid out in books, at two shillings apiece: how many books did he buy?

7. Julius had fourteen marbles which he wished to divide into two equal piles: how many must he put in a pile?

8. How many pounds of ginger, at two shillings a pound, can be bought for sixteen shillings?

9. A man laid out eighteen shillings in apples, at two shillings a bushel: how many bushels did he buy?

10. A man bought twenty dollars worth of shoes, at two dollars a pair: how many pair did he buy?

Note.—The Division Table should be studied in the same manner as the preceding Tables.

DIVISION TABLE.

Two in two,	once.	Two in twelve,	six times.
Two in four,	two times.	Two in fourteen,	seven "
Two in six,	three "	Two in sixteen,	eight "
Two in eight,	four "	Two in eighteen,	nine "
Two in ten,	five "	Two in twenty,	ten "
Three in three,	once.	Three in eighteen,	six times.
Three in six,	two times.	Three in twenty-one,	seven "
Three in nine,	three "	Three in twenty-four,	eight "
Three in twelve,	four "	Three in twenty-sev.,	nine "
Three in fifteen,	five "	Three in thirty,	ten "
Four in four,	once.	Four in twenty-four,	six times.
Four in eight,	two times.	Four in twenty-eight,	seven "
Four in twelve,	three "	Four in thirty-two,	eight "
Four in sixteen,	four "	Four in thirty-six,	nine "
Four in twenty,	five "	Four in forty,	ten "

Five in five,	once.	Five in thirty,	six times
Five in ten,	two times.	Five in thirty-five,	seven "
Five in fifteen,	three "	Five in forty,	eight "
Five in twenty,	four "	Five in forty-five,	nine "
Five in twenty-five,	five "	Five in fifty,	ten "

Six in six,	once.	Six in thirty-six,	six times
Six in twelve,	two times.	Six in forty-two,	seven "
Six in eighteen,	three "	Six in forty-eight,	eight "
Six in twenty-four,	four "	Six in fifty-four,	nine "
Six in thirty,	five "	Six in sixty,	ten "

Seven in seven,	once.	Seven in forty-two,	six times
Seven in fourteen,	two times.	Seven in forty-nine,	seven "
Seven in twenty-one,	three "	Seven in fifty-six,	eight "
Seven in twenty-eight,	four "	Seven in sixty-three,	nine "
Seven in thirty-five,	five "	Seven in seventy,	ten "

Eight in eight,	once.	Eight in forty-eight,	six times
Eight in sixteen,	two times.	Eight in fifty-six,	seven "
Eight in twenty-four,	three "	Eight in sixty-four,	eight "
Eight in thirty-two,	four "	Eight in seventy-two,	nine "
Eight in forty,	five "	Eight in eighty,	ten "

Nine in nine,	once.	Nine in fifty-four,	six times
Nine in eighteen,	two times.	Nine in sixty-three,	seven "
Nine in twenty-sev.,	three "	Nine in seventy-two,	eight "
Nine in thirty-six,	four "	Nine in eighty-one,	nine "
Nine in forty-five,	five "	Nine in ninety,	ten "

Ten in ten,	once.	Ten in sixty,	six times
Ten in twenty,	two times.	Ten in seventy,	seven "
Ten in thirty,	three "	Ten in eighty,	eight "
Ten in forty,	four "	Ten in ninety,	nine "
Ten in fifty,	five "	Ten in a hundred,	ten "

LESSON II.

1. When oranges are three cents apiece, how many can you buy for six cents? How many times three make six?

2. At three cents a yard, how many yards of ribbon can you buy for nine cents? How many times three make nine?

3. George has twelve apples which he wishes to divide equally among three of his companions: how many will each receive? How many times three make twelve?

4. A man gave his three sons eighteen oranges to divide equally among them: how many did each receive?

5. If you walk three miles an hour, how long will it take you to walk fifteen miles? How many times three make fifteen?

6. If you had twenty-one marbles to give three of your companions, how many could you give them apiece?

7. How many barrels of cider, at three dollars a barrel, can I buy for twenty-four dollars? How many times three in twenty-four?

8. A man wishes to set out twenty-seven peach trees in three rows: how many must he put in a row?

9. Three boys caught thirty fishes, and agreed to divide them equally: how many will each one have?

10. If one man can do a piece of work in twenty-one days, how long will it take three men to do it?

LESSON III.

1. How many lemons, at four cents apiece, can be bought for eight cents? How many times four make eight?

2. At four shillings a gallon, how many gallons of molasses can be bought for twelve shillings?

3. William desires to divide twenty apples equally among four boys: how many must he give them apiece?

4. Four scholars recited twenty-four questions in arithmetic: how many questions did each recite?

5. The price of a pair of boots is four dollars: how many pair can I buy for sixteen dollars?

6. If a man walks four miles an hour, how long will it take him to walk thirty-two miles?

7. How long will it take him to walk twenty-eight miles, at four miles an hour?

8. Four boys find a purse containing thirty-six cents, which they wish to divide equally: how many cents will each one receive?

9. A school which contained forty scholars, was divided into four equal classes: how many scholars were there in a class?

LESSON IV.

1. How many spools of cotton, at five cents a spool, can be bought for ten cents? How many times five make ten?

2. How many barrels of flour, at five dollars a barrel, can you buy for twenty dollars?

3. At five shillings a pound, how many pounds of tea can I buy for fifteen shillings?

4. At five cents a pound, how many pounds of lard can be bought for thirty cents?

5. James has twenty-five cents which he wishes to lay out in lemons, at five cents apiece: how many can he buy?

6. When milk is five cents a quart, how many quarts can you buy for forty cents?

7. If you have fifty cents, how many tops can you buy, at five cents apiece?

8. If a man travel five miles an hour, how long will it take him to travel forty-five miles?

9. How long will it take a man to travel fifty miles, if he travels five miles an hour?

•LESSON V.

1. If I had twelve cents, how many bunches of quills could I buy, at six cents a bunch?

2. If you had twenty-four peaches to give to six of your companions, how many could you give them apiece?

3. At six dollars a yard, how many yards of cloth can I buy for eighteen dollars?

4. At six cents an ounce, how many ounces of peppermints can you buy for thirty cents?

5. How many hats, at six dollars apiece, will forty-two dollars buy?

6. How many pounds of tea, at six shillings a pound, will thirty-six shillings buy?

7. A man laid out sixty shillings for lambs, at six shillings apiece: how many did he buy?

8. A merchant paid fifty-four dollars for six muffs: how much was that apiece?

9. At six shillings a bushel, how many bushels of wheat will forty-eight shillings buy?

LESSON VI.

1. Sarah bought seven yards of silk braid for twenty-eight cents : how much did she give a yard ?

2. Susan laid out forty-two cents for ribbon worth seven cents a yard : how many yards did she get ?

3. If seven yards of cloth make one suit of clothes, how many suits will twenty-one yards make ?

4. A teacher wishes to give fourteen pencils to a class of seven scholars : how many pencils can he give to each ?

5. George has thirty-five pears to give to seven boys : how many can he give them apiece ?

6. At seven cents a pound, how many pounds of cotton can be bought for fifty-six cents ?

7. Seven days make a week : how many weeks are there in forty-nine days ?

8. If a stage goes seven miles an hour, how long will it be in going seventy miles ?

9. A man paid sixty-three cents for seven pounds of sugar, what was that a pound ?

LESSON VII.

1. A man gave sixteen shillings to eight beggars : how much did he give to each ?

2. Sarah has twenty-four roses to give to eight little girls : how many can she give them apiece ?

3. How many sheep, at eight shillings a head, can I buy for forty shillings ?

4. Eight quarts make a peck : how many pecks do thirty-two quarts make ?

5. At eight dollars a ton, how much coal can I buy for sixty-four dollars ?

6. When cherries are eight cents a quart, how many quarts can you buy for fifty-six cents?

7. If you have forty-eight cents, how many slates can you buy, at eight cents apiece?

8. If you read eight pages a day, how long will it take you to read a book through, which has seventy-two pages?

9. If a school contains eighty scholars, how many classes can be formed containing eight scholars apiece?

LESSON VIII.

1. When butter is nine cents a pound, how many pounds will twenty-seven cents buy?

2. At nine dollars a barrel, how many barrels of beef can I buy for thirty-six dollars?

3. If nine yards of cloth will make one cloak, how many cloaks will eighteen yards make?

4. If you can buy a quart of molasses for nine cents, how many quarts can you buy for forty-five cents?

5. If nine yards of silk cost seventy-two shillings, what will one yard cost?

6. A man paid sixty-three dollars for nine tons of hay: what was that per ton?

7. A tavern keeper gave fifty-four quarts of oats to nine horses: how many quarts did he give to each horse?

8. If you recite nine questions in arithmetic a day, how many days will it take you to recite eighty-one questions?

9. How many cows, at nine dollars apiece, can a man buy for ninety dollars?

LESSON IX.

1. How many cows, at ten dollars a head, can a man buy for twenty dollars ?

2. A certain school contained forty scholars, which the teacher formed into classes of ten scholars each : how many classes did he form ?

3. At ten dollars per acre, how many acres of land can be bought for fifty dollars ?

4. A man paid eighty cents for a horse and chaise to ride ten miles : how much was that a mile ?

5. How many sheep, at ten shillings a head, can be bought for ninety shillings ?

6. A man laid out sixty dollars for hay, at ten dollars per ton : how many tons did he buy ?

7. If I pay ten cents a quart for blackberries, how many quarts can I buy for thirty cents ?

8. A dairy woman has seventy pounds of butter which she wishes to divide equally among ten customers : how many pounds can she send to each ?

9. If you divide a hundred marbles into ten equal piles, how many will there be in a pile ?

LESSON X.

1. In eight, how many times four ? How many times two ? How many times one ?

2. In six, how many times two ? How many times three ? One ? Six ?

3. In twelve, how many times two ? Three ? Four ? Six ?

4. In ten, how many times five ? Two ? One ?

5. In sixteen, how many times eight ? Four ? Two ? One ?

6. In twenty-four, how many times two? Three? Four? Six? Eight?

7. In eighteen, how many times two? Three? Six? Nine?

8. In twenty, how many times two? Ten? Five?

9. In thirty-six, how many times six? Nine? Three? Four? Two?

10. In thirty-two, how many times eight? Four?

11. In twenty-eight, how many times seven? Four? Two?

12. In forty, how many times ten? Eight? Five?

13. In forty-eight, how many times eight? Six?

14. In sixty-three, how many times seven? Nine?

15. In fifty-six, how many times seven? Eight?

LESSON XI.

1. How many times is three contained in twelve? In eighteen? In fifteen? In twenty-one? In twenty-four? In thirty? In twenty-seven?

2. How many times is five contained in fifteen? In twenty-five? In thirty-five? In fifty?

3. How many times is four contained in sixteen? In twenty-four? In thirty-two? In forty? In thirty-six? In twenty-eight?

4. How many times is six contained in eighteen? In thirty? In twenty-four? In thirty-six? In forty-two? In fifty-four?

5. How many times is eight contained in twenty-four? In thirty-two? In forty-eight? In sixty-four? In fifty-six? In seventy-two?

6. How many times is seven contained in twenty-eight? In thirty-five? In forty-two? In fifty-six? In forty-nine? In sixty-three?

7. How many times is nine contained in twenty-seven? In forty-five? In thirty-six? In fifty-four? In sixty-three?

8. In thirteen, how many times four, and how many over?

Ans. Three times, and one over?

9. Why?

Ans. Because, three times four are twelve, and twelve from thirteen leaves one.

10. In seventeen, how many times five, and how many over?

11. In twenty-six, how many times six, and how many over?

12. In twenty, how many times three, and how many over?

13. In forty-three, how many times five, and how many over?

14. In thirty-nine, how many times six, and how many over?

LESSON XII.

1. How many oranges, at four cents apiece, can you buy for twenty cents?

2. How many thimbles can Sarah buy for thirty-five cents, if she pays seven cents apiece?

3. George paid twenty-four cents for six lead pencils: how much was that apiece?

4. A man gave forty-five dollars for nine sheep: what was the price of the sheep per head?

5. If a man travels seven miles an hour, how long will it take him to travel sixty-three miles?

6. A gentleman divided thirty-five cents equally among five boys: how many cents did each receive?

7. How many barrels of flour, at six dollars a barrel, can be bought for forty-eight dollars?

8. A hatter had forty hats, which he packed in five boxes: how many did he put in a box?

9. A man wishes to walk from New-Haven to Hartford, a distance of thirty-six miles: how long will it take him, if he walks four miles an hour?

10. Seven boys found a pocket-book containing forty-nine dollars, which they shared equally: how much did each receive?

11. When coal is eight dollars a ton, how much can I buy for fifty-six dollars?

12. If one man can build a barn in forty days, how long would it take four men to build it?

LESSON XIII.

1. In what does the solution of the preceding examples of this section, consist?

Ans. It consists in *finding how many times one number is contained in another.*

2. What is the process of finding how many times one number is contained in another, called?

Ans. It is called DIVISION.

3. What is the number to be divided, called?

Ans. The *Dividend*.

4. What is the number by which we divide, called?

Ans. The *Divisor*.

5. What is the answer, called?

Ans. The *Quotient*.

6. What is the number that is sometimes left after dividing, called?

Ans. The *Remainder*.

7. When we say, four is contained in twenty-seven, six times and three over, which is the number to be *divided*? Which the number we divide by? Which the quotient? Which the remainder?

8. When we say, five is contained in thirty-eight, seven times and three over, what is the five called? What is the thirty-eight called? What is the seven called? What is the three called?

9. What is the quotient of twenty-three divided by four, and what the remainder?

10. Five in twenty-eight, how many times, and what the remainder?

11. Six in thirty-four, how many times, and-how many over?

12. Eight in fifty, how many times, and how many over?

LESSON XIV.

EXAMPLES FOR PRACTICE.

1. George paid twenty-four cents for six lemons: how much did they cost apiece?

2. If a man walks five miles an hour, how long will it take him to go forty miles?

3. How many yards of ribbon, at seven cents a yard, can you purchase for twenty-one cents? For thirty-five cents? For forty-two cents?

4. How many thimbles, at six cents apiece, can Mary buy for twenty-four cents. For thirty cents? For forty-two cents? For fifty-four cents?

5. At eight cents a quart, how many quarts of blackberries can you buy for sixteen cents? For thirty-two cents? For forty-eight cents? For twenty-four cents?

6. A man paid forty dollars for eight yards of cloth: how much was that per yard?

7. Henry had sixty-four marbles, which he gave to eight companions: how many did each receive?

8. In three times four, how many times two?

Solution. Three times four are twelve: and two is contained in twelve, six times. *Ans.* Six times.

9. In two times eight, how many times four?

10. In three times six, how many times nine?

11. In eight times three, how many times six?

12. In four times ten, how many times eight?

13. In five times four, how many times ten?

14. In six times six, how many times nine?

15. Three times six are how many times two?

16. Four times six are how many times eight?

17. Six times six are how many times four?

18. How many weeks are there in forty-two days, there being seven days in a week? In thirty-five days, how many weeks?

19. A man laid out twenty-eight shillings in wheat, at seven shillings a bushel: how many bushels did he buy?

20. If slates cost eight cents apiece, how many can you buy for sixty-four cents?

21. If the price of coffee is nine cents a pound, how many pounds can I buy for forty-five cents? For sixty-three cents? For seventy-two cents?

22. If land is ten dollars an acre, how many acres can a man buy for eighty dollars?

23. At seven dollars a yard, how many yards of cloth can be bought for sixty-three dollars?

24. How long will it take a stage to go seventy-two miles, if it goes at the rate of eight miles an hour?

SECTION VI.

ARABIC NOTATION. .

In the preceding lessons, *numbers* have been expressed by *words*. In business calculations, however, they are commonly denoted by the following *figures* ; viz :

1	2	3	4	5	6	7	8	9	0
one, two, three, four, five, six, seven, eight, nine, nought.*									

To express *ten*, we use 1 and 0, thus 10 ; to express *eleven*, we use two 1s, thus 11 ; to express *twelve*, we use 1 and 2, thus 12 ; and so on, as in the following

TABLE.

1, one.	21, twenty-one.	41, forty-one.
2, two.	22, twenty-two.	42, forty-two.
3, three.	23, twenty-three.	43, forty-three.
4, four.	24, twenty-four.	44, forty-four.
5, five.	25, twenty-five.	45, forty-five.
6, six.	26, twenty-six.	46, forty-six, &c.
7, seven.	27, twenty-seven.	50, fifty.
8, eight.	28, twenty-eight.	51, fifty-one, &c.
9, nine.	29, twenty-nine.	60, sixty.
10, ten.	30, thirty.	61, sixty-one, &c.
11, eleven.	31, thirty-one.	70, seventy.
12, twelve.	32, thirty-two.	71, seventy-one, &c.
13, thirteen.	33, thirty-three.	80, eighty.
14, fourteen.	34, thirty-four.	81, eighty-one, &c.
15, fifteen.	35, thirty-five.	90, ninety.
16, sixteen.	36, thirty-six.	91, ninety-one, &c.
17, seventeen.	37, thirty-seven.	100, one hundred.
18, eighteen.	38, thirty-eight.	200, two hundred.
19, nineteen.	39, thirty-nine.	300, three hundred, &c.
20, twenty.	40, forty.	1000, one thousand.

*The pupil should be able to *distinguish* and to *write* these ten figures, before he attempts to express larger numbers. By a few hints from his teacher as to the manner of combining them, he will easily learn to express any number from ten up to a thousand, and so on.

ROMAN NOTATION.

Another method of expressing numbers is by the following letters; viz: I, V, X, L, C; D, M. The manner of doing this may be learned from the following

TABLE.

I denotes one.	XXX denote thirty.
II " two.	XL " forty.
III " three.	L " fifty.
IV " four.	LX " sixty.
V " five.	LXX " seventy.
VI " six.	LXXX " eighty.
VII " seven.	XC " ninety.
VIII " eight.	C " one hundred.
IX " nine.	CI " one hundred and one.
X " ten.	CX " one hundred and ten.
XI " eleven.	CC " two hundred.
XII " twelve.	CCC " three hundred.
XIII " thirteen.	CCCC " four hundred.
XIV " fourteen.	D " five hundred.
XV " fifteen.	DC " six hundred.
XVI " sixteen.	DCC " seven hundred.
XVII " seventeen.	DCCC " eight hundred.
XVIII " eighteen.	DCCCC " nine hundred.
XIX " nineteen.	M " one thousand.
XX " twenty.	MC " one thousand & one hund.
XXI " twenty-one.	MD " one thousand & five hund.
XXII " twenty-two.	MDCCCXLVI, one thousand eight hundred and forty-six.

EXERCISES IN NOTATION.

I. Write the following numbers in *figures* upon your slate, or black-board.

- | | |
|-------------------|-------------------|
| 1. Eleven. | 2. Seventeen. |
| 3. Twenty-one. | 4. Sixty-three. |
| 5. Forty-seven. | 6. Eighty-six. |
| 7. Seventy-eight. | 8. Fifty-seven. |
| 9. Sixty-five. | 10. Ninety-three. |
| 11. Eighty-nine. | 12. Ninety-five. |

13. One hundred and one.
14. One hundred and five.
15. One hundred and seven.
16. One hundred and ten.
17. Two hundred and fourteen.
18. Four hundred and twenty-three.
19. Three hundred and ninety-five.
20. Three hundred.
21. Two hundred and thirty.
22. Six hundred.
23. Four hundred and fifty-five.
24. Seven hundred and sixty.
25. Eight hundred and sixty-five.
26. Nine hundred and eighty-seven.
27. One thousand.

1. What is the art of expressing numbers, by figures and letters, called ?

Ans. It is called NOTATION.

2. What is the method of expressing numbers by figures, called ?

Ans. The *Arabic* Notation.

3. Why is it called the Arabic notation.

Ans. Because it was invented by the *Arabians*.

4. What is the method of expressing numbers by letters, called ?

Ans. The *Roman* Notation.

5. Why is it called the Roman Notation ?

Ans. Because it was invented by the *Romans*.

6. Which of the above systems of Notation, is commonly used ?

Ans. The *Arabic* Notation.

EXERCISES IN NUMERATION.

Read the numbers expressed by the following figures.

13	57	100	310
17	39	101	295
25	86	119	430
52	48	116	375
36	79	107	537
71	91	121	426
63	37	110	111
27	81	130	239
19	65	126	685
43	58	140	491
34	73	129	507
56	89	105	810
41	92	150	740
65	78	162	936
24	94	201	845
68	86	214	987
73	98	196	1000

What is the art of reading numbers expressed by figures, called?

Ans. It is called NUMERATION.

MISCELLANEOUS EXAMPLES.

1. James bought a lemon for 4 cents, and a pound of figs for 8 cents: how much did he pay for both?

Solution. 4 cents and 8 cents are 12 cents. *Ans.* 12 cents.

2. A man bought a pound of tea for 4 shillings, and a gallon of molasses for 3 shillings: how many shillings did he pay for both?

3. Horace paid 6 cents for some marbles, and 3

cents for a top, and 1 cent for a whistle : how many cents did he pay for all ?

4. How many are 5 and 3 ? 2 and 4 ? 3 and 6 ? 4 and 3 ?

5. How many are 6 and 2 ? 5 and 4 ? 4 and 7 ? 6 and 5 ?

6. How much will 3 oranges cost, at 4 cents apiece ?

Solution. If 1 orange costs 4 cents, 3 oranges will cost 3 times as much : and 3 times 4 cents are 12 cents. *Ans.* 12 cents.

7. If 1 quart of strawberries cost 6 cents, what will 2 quarts cost ? 2 times 4 are how many ?

8. What cost 3 barrels of flour, at 5 dollars a barrel ? 4 barrels ? 5 barrels ?

9. 2 times 5 are how many ? 2 times 6 ? 5 times 3 ?

10. What cost 4 bushels of cranberries, at 3 dollars a bushel ? 6 bushels ?

11. What cost 6 sheep, at 4 dollars a head ? 8 sheep ?

12. What cost 8 cords of wood, at 3 dollars a cord ? 7 cords ? 10 cords ?

13. How many are 7 times 3 ? 5 times 8 ? 6 times 4 ? 4 times 8 ?

14. Henry had 9 apples, and gave away 4 : how many had he left ?

Solution. 4 apples taken from 9 apples leave 5 apples. *Ans.* 5 apples.

15. Sarah had ten peaches, and gave away 3 : how many had she left ?

16. If you have 12 marbles, and lose 5 of them, how many will you have left ?

17. 3 from 7 leaves how many ? 5 from 8 ? 4 from 9 ?

18. 5 from 11 leaves how many? 6 from 10? 7 from 12? 8 from 13? 6 from 15?

19. William bought a knife for 18 cents, and sold it for 5 cents less than cost: how much did he sell it for?

20. How many yards of ribbon, at 6 cents a yard, can be bought for 30 cents?

Solution. If 6 cents buy 1 yard, 30 cents will buy as many yards as 6 is contained times in 30: and 6 is contained in 30, 5 times. *Ans.* 5 yards.

21. How many bushels of corn, at 4 shillings a bushel, can a man buy for 16 shillings?

22. If I have 18 peaches to give to 6 boys, how many can I give them apiece?

23. How many hats, at 5 dollars apiece, can you buy for 20 dollars?

24. How many times 6 in 24? In 30? In 42?

25. How many times 4 in 28? In 20? In 36? In 40? In 24?

26. A man bought 8 yards of cloth, at 3 dollars a yard, and paid for it in flour, at 4 dollars a barrel: how many barrels did it take?

27. A farmer bought 6 pounds of tea, at 4 shillings a pound, and paid for it in wheat, at 8 shillings a bushel: how many bushels did it take?

28. A man bought a cow for 10 dollars, and sold it for 16 dollars: how much did he make by his bargain?

29. If Horatio buys 6 oranges, at three cents apiece, and sells them again for 4 cents apiece, how much will he make by his bargain?

30. In 5 times 8, how many times 10?

31. In 6 times 6, how many times 4?

32. In 8 times 3, how many times 6?

33. A butcher sold 8 pounds of beef for 56 cents : what was that a pound ?

34. A dairy-man sold 10 pounds of butter for 80 cents : how much did he get a pound ?

35. A farmer sold 10 bushels of oats, at 3 shillings a bushel, and took 7 yards of flannel, at 4 shillings a yard, and the rest in money : how much money did he receive ?

36. What is the difference between 3 times 6, and 7 times 3 ?

37. What is the difference between 5 times 6, and 4 times 8 ?

38. In 21, how many times 5, and how many over ?

Ans. 4 times, and 1 over.

39. In 18, how many times 4, and how many over ?

40. In 30, how many times 7, and how many over ?

41. In 37, how many times 9, and how many over ?

42. In 45, how many times 7, and how many over ?

43. In 66, how many times 9, and how many over ?

44. If 3 coats cost 24 dollars, how much will 1 coat cost ?

Solution. If 3 coats cost 24 dollars, 1 coat will cost as many dollars as 3 is contained times in 24 : and 3 is contained in 24, 8 times.

45. How many hats, at 5 dollars apiece, can be bought for 35 dollars ?

46. How much flour, at 7 dollars a barrel, can a man buy for 42 dollars ?

47. How many yards of cloth, at 9 dollars a yard, will 36 dollars buy ?

48. How many tons of coal, at 8 dollars a ton, will 64 dollars buy ?

49. A man bought 8 pair of boots at 3 dollars a pair, and paid for them in flour, at 6 dollars a barrel : how many barrels did it take ?

50. If you buy 4 pen knives at 10 cents apiece, and pay for them in beech nuts, at 5 cents a quart, how many quarts will it take ?

51. A farmer sold 6 pounds of butter for 10 cents a pound, and took his pay in molasses, at 6 cents a quart : how many quarts did he receive ?

52. When wheat is 7 shillings a bushel, how many bushels can be bought for 63 shillings ?

53. Six boys found a purse of money containing 48 dollars, which they divided among themselves equally : how many dollars did each receive ?

54. If a man has 45 dollars, how many whole barrels of flour can he buy, at 6 dollars a barrel, and how many dollars will he have over ?

55. At 5 dollars a yard, how many whole yards of cloth can be bought for 28 dollars, and how many dollars over ?

56. In 85, how many times 9, and how many over ?

57. In 107, how many times 10, and how many over ?

58. In 95, how many times 9, and how many over ?

59. In 83, how many times 8, and how many over ?

60. In 109, how many times 10, and how many over ?

SECTION VII.

FRACTIONS.

LESSON I.

1. If I divide any number or thing, as an apple or a pear, into *two equal* parts, what is each of those parts called ?

Ans. One half.

2. What then is meant by *one half* ?

3. How many *halves* make a *whole* one ?

Ans. Two.

4. If I cut a sheet of paper into halves and give you 1 half, what part of the sheet shall I have left ? If I give you 2 halves, how much would be left ?

Note.—The meaning of the terms *one half*, *one third*, *one fourth*, &c., should be illustrated to the pupil by actually cutting some familiar object, as an apple or a pear, into *halves*, *thirds*, *fourths*, &c. In this way, he will easily comprehend the meaning of the terms used in fractions, and will be able to perform operations in them with as much facility as in whole numbers.

5. If any number or thing is divided into *three equal* parts, what is each of the parts called ?

Ans. One third.

6. What then is meant by *one third* ? What is meant by *two thirds* ?

7. If I cut an apple into thirds and give away 1 third, what part will be left ? If I give away 2 thirds, what part will be left ?

8. How many *thirds* make a whole one ?

9. If a number or thing is divided into *four equal* parts, what is each of the parts called ?

Ans. One fourth, or one quarter ?

10. What is meant by 2 fourths ? By 3 fourths ?

11. If you divide a stick of candy in fourths, and give 3 fourths of it to your companions, what part of it would you have left?

12. If you give away 1 fourth, what part would be left?

13. Two fourths and one fourth make how many fourths? Three fourths and one fourth, make how many fourths?

14. How many *fourths* make a whole one?

LESSON II.

1. What is meant by 1 fifth?

Ans. When any thing is divided into *five equal* parts, one of these parts is called 1 fifth.

2. What is meant by 2 fifths? By 3 fifths? By 4 fifths?

3. If you cut a pie into fifths, and take away 2 fifths, how many fifths will remain?

4. 3 fifths and 2 fifths make how many fifths?

5. How many *fifths* make a whole one?

6. What is meant by 1 sixth? By 2 sixths? By 5 sixths? By 3 sixths?

7. James had 2 sixths of a dollar, and his father gave him 3 sixths more: what part of a dollar had he then?

8. How many *sixths* make a whole one?

9. What is meant by 1 seventh? By 2 sevenths? By 3 sevenths? By 5 sevenths?

10. What part of a dollar will 2 sevenths and 4 sevenths make?

11. A man hoed 3 sevenths of an acre of corn in one day, and 2 sevenths of an acre the next day: what part of an acre did he hoe in both days?

12. How many *sevenths* make a whole one?
13. What is meant by 1 eighth? By 2 eighths? By 3 eighths? By 5 eighths? By 7 eighths?
14. How many *eighths* make a whole one?
15. What is meant by 1 ninth? By 2 ninths? By 8 ninths?
16. How many *ninths* make a whole one?
17. What is meant by 3 tenths? By 5 tenths? By 7 tenths?
18. What is meant by 1 fifteenth? By 2 fifteenths? By 3 fifteenths? By 7 fifteenths? By 10 fifteenths?
19. What is meant by 1 twentieth? By 2 twentieths? By 8 twentieths? By 12 twentieths?
20. How many *thirtieths* make a whole one? How many *forty-fifths* make a whole one? How many *sixty-fourths* make a whole one? How many *hundredths* make a whole one?

LESSON III.

1. If one half of a pear cost 1 cent, how much will two halves or a whole pear cost?

Suggestion. 2 halves or a whole pear will cost twice as much as 1 half. Now 1 half costs 1 cent, hence 2 halves or a whole one will cost 2 times 1 cent: and 2 times 1 cent are 2 cents. *Ans.* 2 cents.

2. If 1 half an orange cost 2 cents, how much will a whole orange cost?

3. If 1 half a yard of ribbon cost 3 cents, what will a whole yard cost?

4. If 1 third of a pie cost 2 cents, how much will 2 thirds of a pie cost? How much will 3 thirds or a whole pie cost?

5. If 1 fourth of a pound of sugar cost 2 cents,

how much will 2 fourths cost? 3 fourths? A whole pound?

6. A man sold $\frac{1}{5}$ of a cord of wood for 3 shillings: how much would $\frac{3}{5}$ come to at the same rate? A whole cord?

7. If $\frac{1}{6}$ of a barrel of flour cost 1 dollar, how much will $\frac{4}{6}$ of a barrel cost? $\frac{6}{6}$ sixths?

8. If $\frac{1}{7}$ of a ton of hay is worth 2 dollars, what is $\frac{3}{7}$ worth? $\frac{4}{7}$? $\frac{6}{7}$? $\frac{7}{7}$ sevenths?

9. If $\frac{1}{8}$ of a yard of cloth cost 1 dollar, how much will $\frac{5}{8}$ cost? $\frac{3}{8}$? $\frac{7}{8}$? $\frac{8}{8}$ eighths?

10. If $\frac{1}{9}$ of an acre of land is worth 3 dollars, how much is $\frac{4}{9}$ worth? $\frac{5}{9}$? $\frac{7}{9}$? $\frac{8}{9}$ ninths?

11. One tenth of a hogshead of molasses is worth 3 dollars: how much is $\frac{5}{10}$ of a hogshead worth? $\frac{7}{10}$? $\frac{9}{10}$? How much is a hogshead worth?

LESSON IV.

1. If a yard of tape is worth 2 cents, how much is $\frac{1}{2}$ a yard worth?

Solution. Since a whole yard is worth 2 cents, $\frac{1}{2}$ of a yard is worth $\frac{1}{2}$ as much: and $\frac{1}{2}$ of 2 cents is 1 cent. *Ans.* 1 cent.

2. What is $\frac{1}{2}$ of 4 cents. *Ans.* 2 cents.

Why?

Ans. If 4 cents are divided into two equal parts, one of the parts is 2 cents.

3. If an orange cost 4 cents, how much will $\frac{1}{2}$ an orange cost?

4. What is 1 half of 6 cents ? What is 1 half of 8 cents ? Of 10 cents ? Of 12 cents ? Of 16 cents ? Of 20 cents ?

5. If a lemon cost 6 cents, how much will 1 third of a lemon cost ? What is 1 third of six cents ?

6. What is 1 third of 9 cents ? What is 1 third of 12 cents ? Of 18 cents ? Of 15 cents ? Of 24 cents ? Of 30 cents ?

Suggestion. From the preceding examples, the learner will perceive that a *half* of a number is equal to as many units as 2 is contained times in that number ; a *third* of a number is equal to as many units as 3 is contained times in that number ; a *fourth* of a number is equal to as many units as 4 is contained times in that number, &c.

7. How do you find a *half* of a number ?

Ans. Divide the number by 2.

8. How find a *third* of a number ? How find a *fourth* of a number ? A fifth ? A sixth ? A seventh ? An eighth ? A ninth ? A tenth ?

9. What is 1 fourth of 12 dollars ? Of 16 dollars ? Of 20 ? Of 32 ? Of 24 ? Of 28 ? Of 36 ? Of 40 ?

10. If a ton of coal is worth 10 dollars, what is 1 fifth of a ton worth ?

11. What is 1 fifth of 15 dollars ? Of 20 dollars ? Of 30 ? Of 25 ? Of 40 ? Of 50 ?

12. What is one seventh of 7 ? Of 14 ? Of 28 ? Of 49 ? Of 70 ?

13. What is one eighth of 16 ? Of 24 ? Of 40 ? Of 80 ? Of 72 ?

14. What is 1 ninth of 9 ? Of 27 ? Of 18 ? Of 36 ? Of 45 ? Of 72 ? Of 90 ?

15. What is one tenth of 10 ? Of 30 ? Of 20 ? Of 60 ? Of 50 ? Of 100 ?

LESSON V.

1. How much will 2 apples cost, at 1 half a cent apiece?

Solution. Since 1 apple costs 1 half a cent, 2 apples will cost 2 times as much : and 2 times 1 half are 2 halves or a whole cent. *Ans.* 1 cent.

2. What cost 3 apples, at 1 half a cent apiece ?

Solution. If 1 apple costs 1 half a cent, 3 apples will cost three times as much or 3 halves : and 3 halves are equal to 1 whole cent and 1 half, *Ans.* 1 cent and 1 half.

3. At 1 third of a dollar a bushel, how much will 6 bushels of oats cost ?

4. What cost 2 pounds of tea, at 3 fourths of a dollar a pound ? How much is 2 times 3 fourths ?

5. In 8 fourths, how many whole ones ? In 9 fourths, how many whole ones, and how many fourths over ? In 13 fourths ? In 15 fourths ?

6. What cost 3 yards of flannel, at 2 fifths of a dollar a yard ? How much is 3 times 2 fifths ?

7. In 10 fifths, how many whole ones ? In 12 fifths ? In 15 fifths ? In 20 fifths ? In 32 fifths ?

8. At 3 eighths of a dollar a bushel, how much will 4 bushels of apples come to ?

9. In 24 eighths, how many whole ones ? In 19 eighths ? In 33 eighths ? In 40 eighths ?

10. At 7 tenths of a dollar a pair, how much will 3 pair of gloves come to ?

11. How much is 3 times 4 fifths ?

12. How much is 4 times 6 eighths ?

13. How much is 7 times 4 tenths ?

14. How much is 5 times 7 ninths ?

LESSON VI.

1. What part of 2 cents is 1 cent? *Ans.* 1 half.
Why?

Ans. Because, if we divide 2 cents into *two* equal parts, one of these parts is 1 cent; and when any thing, is divided into two equal parts, one of these parts is called 1 *half*.

2. What part of 3 cents is 1 cent? Why?

3. What part of 3 cents is 2 cents?

Solution. Since 1 is 1 third of 3, 2 is 2 times as much: and 2 times 1 third is 2 thirds. *Ans.* 2 thirds.

4. What part of 3 is 4?

Ans. 4 thirds of 3, which are equal to 1 and 1 third.

5. What part of 4 pears is 1 pear? What part of 4 is 2? Is 3? Is 5? Is 8? Is 9? Is 12?

6. What part of 5 dollars is 1 dollar? What part of 5 is 2? Is 3? Is 4? Is 6? Is 8? Is 10? Is 12? Is 15? Is 20?

7. What part of 6 pins is 1 pin? What part of 6 is 2? Is 3? Is 5? Is 7? Is 8? Is 12? Is 18?

8. What part of 8 apples is 1 apple? What part of 8 is 2? Is 3? Is 5? Is 7? Is 16? Is 20?

9. What part of 7 days is 1 day? What part of 7 is 2? Is 3? Is 6? Is 8? Is 14? Is 18?

10. What part of 10 nuts is 1 nut? What part of 10 is 2? Is 5? Is 3? Is 25? Is 30? Is 35?

11. What part of 12 pence is 1 penny? What part of 12 is 2? Is 3? Is 6? Is 18? Is 24? Is 28? Is 30? Is 47?

12. What part of 16 ounces is 1 ounce? What part of 16 is 2? Is 5? Is 10? Is 12? Is 16? Is 18? Is 25?

13. What part of 20 shillings is 1 shilling? What part of 20 is 3? Is 7? Is 10? Is 40?

14. What part of 30 is 1? Is 2? Is 5? Is 26? Is 35? Is 48?

15. What part of 100 is 1? Is 3? Is 10? Is 50? Is 73? Is 85?

LESSON VII.

1. If you can buy an orange for 4 cents, what part of an orange can you buy for 1 cent?

Solution. 1 cent is 1 fourth part of 4 cents: 1 cent will therefore buy 1 fourth as much as 4 cents. Now if 4 cents will buy a whole orange, 1 cent will buy 1 fourth part of an orange. *Ans.* 1 fourth of an orange.

2. At 6 shillings a pound, what part of a pound of tea can be bought for 1 shilling? For 2 shillings? For 3 shillings? For 5 shillings?

3. At 8 cents a pound, what part of a pound of saleratus can you buy for 1 cent? For 2 cents? For 3 cents? For 5 cents? For 7 cents? For 8 cents?

4. Seven days make a week: what part of a week is 1 day? What part of a week are 2 days? 3 days? 6 days? 5 days?

5. At 6 cents a yard, what part of a yard of calico can you buy for 1 cent? For 5 cents? For 6 cents? For 7 cents?

6. At 6 cents a yard, how much calico can you buy for 7 cents?

Suggestion. Since 6 cents will buy 1 yard, 1 cent will buy 1 sixth of a yard; and 7 cents will buy 7 times as much; and 7 times 1 sixth is 7 sixths, equal to 1 whole one and 1 sixth.

Ans. 1 yard and 1 sixth of a yard.

7. At 5 cents a yard, what part of a yard of silk braid can you buy for 1 cent? How much can you buy for 5 cents? For 6 cents? For 10 cents?

8. At 10 dollars an acre, what part of an acre of land can you buy for 1 dollar? For 3 dollars? For 12 dollars? For 15 dollars? For 20 dollars?

9. What part of a pound of butter, at 12 cents a pound, can be bought for 1 cent? For 5 cents? For 15 cents?

10. At 15 cents a pound, what part of a pound of figs can you buy for 1 cent? For 16 cents?

11. Twenty shillings make a pound: what part of a pound is 1 shilling? 2 shillings? 15 shillings? 20 shillings? 22 shillings? 30 shillings?

LESSON VIII.

1. What will 2 oranges cost, at 3 and 1 half cents apiece?

Solution. If 1 orange costs 3 and 1 half cents, 2 oranges will cost twice as much: and 2 times 3 cents are 6 cents, and 2 times 1 half are 2 halves, equal to 1 cent. Now 1 cent and 6 cents make 7 cents. *Ans.* 7 cents.

2. What will 5 yards of tape cost, at 2 and 1 third cents a yard?

Solution. Since 1 yard of tape cost 2 and 1 third cents, 5 yards will cost 5 times as much: and 5 times 2 cents are 10 cents; and 5 times 1 third are 5 thirds, equal to 1 cent and 2 thirds. Now 1 and 2 thirds cents added to 10 cents, make 11 and 2 thirds cents. *Ans.* 11 and 2 thirds cents.

3. What will 4 pounds of beef cost, at 3 and 1 half cents a pound?

4. What cost 6 yards of cloth, at 2 and 1 half dollars per yard? How much is 6 times 2 and 1 half?

5. At 3 shillings a yard, what will 4 and 2 thirds yards of ribbon come to?

6. Sarah bought 8 and 3-fourths yards of cashmere, at 4 shillings a yard: how much did it come to?

7. A farmer bought 10 sheep, at 2 and 1 third dollars a head: how much did they come to?

8. In 1 rod there are 5 and 1 half yards: how many yards are there in 8 rods?

9. How much is 5 times 4 and 3 fourths?

10. How much is 7 times 6 and 4 sevenths?

11. How much is 6 times 4 and 3 ninths?

12. How much is 8 times 5 and 5 sixths?

LESSON IX.

1. If 1 barrel of flour cost 9 dollars, how much will 2 thirds of a barrel cost?

Solution. If 1 barrel costs 9 dollars, 2 thirds of a barrel will cost 2 thirds of 9 dollars. Now 1 third of 9 dollars is 3 dollars, and 2 thirds will be twice as much; and 2 times 3 dollars are 6 dollars.

Ans. 6 dollars.

2. If 1 yard of cloth cost 6 dollars, how much will 2 thirds of a yard cost?

Suggestion. First find how much 1 third will cost; then 2 thirds. (See suggestion p. 82.)

3. How much is 2 thirds of 6? Of 9? Of 12?

4. If a pie costs 12 cents, what will 3 fourths of a pie cost? How much is 3 fourths of 12?

5. How much will 2 fifths of a ton of coal cost, at 10 dollars a ton? How much will 4 fifths of a ton cost?

6. How much will 3 sevenths of an acre of land cost, at 21 dollars per acre?

7. If a ton of hay costs 16 dollars, what will 5 eighths of a ton cost?

8. If a drum of figs cost 18 shillings, how much will 2 ninths of a drum cost? 4 ninths?

9. At 20 shillings a barrel, how much will 4 fifths of a barrel of cider cost?

10. How much is 3 fourths of 4? Of 8? Of 16?

11. How much is 5 sevenths of 14? Of 21?

LESSON X.

1. When a number or thing is divided into *equal parts*, as halves, thirds, fourths, &c., what are those parts called?

Ans. They are called FRACTIONS.

2. How are fractions commonly written?

Ans. By two numbers, one above the other, with a line between them. For example,

One half	is	written	thus,	$\frac{1}{2}$	—
One third		"	"	$\frac{1}{3}$	
One fourth		"	"	$\frac{1}{4}$	
One fifth		"	"	$\frac{1}{5}$	
Three fifths		"	"	$\frac{3}{5}$	
One sixth		"	"	$\frac{1}{6}$	
Five sixths		"	"	$\frac{5}{6}$	, &c.

3. When we express *one half* by figures, thus $\frac{1}{2}$, what does the figure 2, which is placed below the line, show?

Ans. The 2 shows that the number or thing is divided into *two* equal parts.

4. What does the 1 placed above the line, show?

Ans. It shows that *one* of those parts is denoted by the fraction.

5. In the expression $\frac{3}{5}$, what does the 5, which is placed below the line, show?

Ans. It shows that the number or thing is divided into *five* equal parts.

6. What does the 3 above the line, show?

Ans. It shows that *three* of those parts are denoted by the fraction.

7. What is the number below the line called?

Ans. It is called the DENOMINATOR?

8. What does it show?

Ans. It shows into *how many equal parts* the number or thing is divided.

9. What is the number above the line called?

Ans. It is called the NUMERATOR.

10. What does it show?

Ans. It shows *how many* parts are expressed by the fraction.

N. B. The number below the line is called the *denominator*, because it gives the name, as halves, thirds, fifths, &c., to the fraction. The number above the line is called the *numerator*, because it numbers the parts, or shows how many parts are expressed by the fraction.

Note.—Particular pains should here be taken to explain to the young pupil, by some visible illustration, what the *denominator* and *numerator* signify. (See Note p. 78.)

11. When a whole number and a fraction are written together, as $2\frac{1}{2}$, $4\frac{2}{3}$, &c., what is the expression called?

Ans. It is called a *mixed number*.

12. What then is a mixed number?

13. How are the expressions $2\frac{1}{2}$, and $4\frac{2}{3}$, read?

Ans. $2\frac{1}{2}$ is read, *Two and a half*; and $4\frac{2}{3}$, *Four and two thirds*.

14. Read the following: $3\frac{1}{2}$; $4\frac{2}{3}$; $8\frac{1}{4}$; $7\frac{3}{5}$; $10\frac{1}{6}$.

MISCELLANEOUS EXAMPLES.

1. Henry had $\frac{3}{4}$ of a dollar, and his father gave him $\frac{1}{4}$, and his mother $\frac{3}{4}$ of a dollar more: how much money had he then?

Solution. 3 fourths and 1 fourth are 4 fourths, and 3 fourths make 7 fourths. *Ans.* $\frac{7}{4}$ of a dollar.

Note.—When the numerator is *equal* to or *greater* than the denominator, the fraction is called an *improper* fraction. Thus, $\frac{7}{4}$ is an improper fraction, and is equal to $1\frac{3}{4}$. So $\frac{3}{2}$ is an improper fraction, and is equal to 1.

2. If you have $\frac{5}{8}$ of a dollar, and earn $\frac{7}{8}$, and find $\frac{3}{4}$ of a dollar more, how much money will you have?

3. A merchant sold a bushel of corn for $\frac{8}{10}$ of a dollar, a gallon of molasses for $\frac{3}{10}$ of a dollar, and a pound of tea for $\frac{5}{10}$ of a dollar: how much did he receive for all?

4. How much are $\frac{3}{8}$, and $\frac{7}{8}$, and $\frac{5}{8}$, and $\frac{1}{8}$?

5. How much are $\frac{3}{9}$, and $\frac{5}{9}$, and $\frac{7}{9}$, and $\frac{2}{9}$?

6. How much are $\frac{9}{12}$, and $\frac{3}{12}$, and $\frac{7}{12}$, and $\frac{10}{12}$?

7. If you have $\frac{7}{8}$ of a dollar, and lose $\frac{5}{8}$ of a dollar, how much will you have left?

Solution. 5 eighths from 7 eighths leave 2 eighths. *Ans.* $\frac{2}{8}$ of a dollar.

8. If you have $\frac{4}{5}$ of an orange, and give away $\frac{2}{5}$, how much will you have left?

9. If you have a whole orange and give away $\frac{2}{5}$ of it, how much will you have left?

10. Take $\frac{2}{9}$ from $\frac{8}{9}$.

11. Take $\frac{3}{7}$ from $\frac{5}{7}$.

12. Take $\frac{6}{14}$ from $\frac{10}{14}$.

13. Take $\frac{10}{12}$ from $\frac{12}{12}$.

14. Take $\frac{10}{11}$ from $\frac{6}{11}$.

15. Take $\frac{2}{3}$ from $\frac{9}{3}$.

16. If a pear costs 2 cents, how much will $\frac{1}{2}$ of a pear cost?

Solution. Since a whole pear costs 2 cents, 1 *half* of a pear will cost *half* as much: and half of 2 cents is 1 cent. *Ans.* 1 cent.

17. What will $\frac{1}{2}$ of a barrel of flour cost, at 6 dollars a barrel?

18. What will $\frac{1}{3}$ of a pound of starch cost, at 6 cents a pound?

19. What cost $\frac{1}{4}$ of a pound of sugar, at 8 cents a pound?

20. What cost $\frac{1}{5}$ of a pound of honey, at 10 cents a pound? $\frac{2}{5}$ of a pound? $\frac{4}{5}$ of a pound?

21. What cost $\frac{1}{6}$ of a hogshead of molasses, at 30 dollars a hogshead?

22. At 6 dollars a barrel, what will $\frac{1}{2}$ of a barrel of beef cost? What will $\frac{1}{3}$ of a barrel cost?

23. At 8 cents a pound, what will $\frac{1}{4}$ of a pound of lard cost? $\frac{1}{5}$ of a pound?

24. At 12 cents a yard, how much will $\frac{1}{3}$ of a yard of cambric cost? $\frac{1}{4}$ of a yard? $\frac{1}{5}$ of a yard?

25. At 16 cents a pound, how much will $\frac{1}{4}$ of a pound of raisins cost? $\frac{1}{5}$ of a pound? $\frac{1}{6}$ of a pound?

26. At 18 cents apiece, how much will $\frac{1}{2}$ a watermelon cost? $\frac{1}{3}$ of a watermelon? $\frac{1}{4}$ of a watermelon?

27. At 24 dollars an acre, how much will $\frac{1}{3}$ of an acre of land cost? $\frac{1}{4}$ of an acre? $\frac{1}{5}$ of an acre? $\frac{1}{6}$ of an acre?

28. If a box of lemons costs 30 shillings, how much will $\frac{1}{2}$ of a box cost? $\frac{1}{3}$ of a box? $\frac{1}{4}$ of a box? $\frac{1}{5}$ of a box? $\frac{1}{6}$ of a box?

TABLES OF COINS, WEIGHTS, AND MEASURES.

FEDERAL MONEY.

I. Federal Money is the currency of the United States. The denominations are, *Eagles, dollars, dimes, cents, and mills.*

10 mills (m.)	make 1 cent, marked <i>ct.</i>
10 cents	" 1 dime, " <i>d.</i>
10 dimes	" 1 dollar, " <i>doll. or \$</i>
10 dollars	" 1 eagle, " <i>E.</i>

Note.—Federal money was established by Congress, Aug. 8th, 1786. Previous to this, English or Sterling money was the principal currency of the country.

STERLING MONEY.

II. *Sterling Money* is the national currency of England.

4 farthings (<i>gr. or far.</i>)	make 1 penny, marked <i>d.</i>
12 pence	" 1 shilling, " <i>s.</i>
20 shillings	" 1 pound, or sovereign, <i>£.</i>
21 shillings	" 1 guinea.

Note.—The Pound Sterling, according to *Act of Congress, 1842*, is equal to 4 dollars and 84 cents.

TROY WEIGHT.

III. *Troy Weight* is used in weighing gold, silver, jewels, liquors, &c., and is generally adopted in philosophical experiments.

24 grains (<i>gr.</i>)	make 1 penny weight, marked <i>pwt.</i>
20 pennyweights	" 1 ounce, " <i>oz.</i>
12 ounces	" 1 pound, " <i>lb.</i>

Note.—Most children have very erroneous or indistinct ideas of the *weights and measures*, in common use. It is, therefore, strongly recommended for teachers to illustrate them *practically*, by referring to some visible object of equal magnitude, or by exhibiting the ounce; the pound; the linear inch, foot, yard, and rod; also a *square* and *cubic* inch, foot, and yard; the pint, quart, gallon, peck, bushel, &c.

AVOIRDUPOIS WEIGHT.

IV. *Avoirdupois Weight* is used in weighing groceries and all coarse articles; as sugar, tea, coffee, butter, cheese, flour, hay, &c., and all metals except gold and silver.

16 drams (<i>dr.</i>)	make 1 ounce,	marked <i>oz.</i>
16 ounces	" 1 pound,	" <i>lb.</i>
25 pounds	" 1 quarter,	" <i>qr.</i>
4 quarters	" 1 hundred weight,	" <i>cwt.</i>
20 hundred weight	" 1 ton,	" <i>T.</i>

Note.—Formerly it was the custom to allow 112 pounds for a hundred weight, and 28 pounds for a quarter; but this practice has become nearly or quite obsolete.

APOTHECARIES WEIGHT.

V. *Apothecaries Weight* is used by apothecaries and physicians in *mixing* medicines.

20 grains (<i>gr.</i>)	make 1 scruple,	marked <i>sc.</i> or	9
3 scruples	" 1 dram,	" <i>dr.</i> or	3
8 drams	" 1 ounce,	" <i>oz.</i> or	3
12 ounces	" 1 pound,	"	16

LONG MEASURE.

VI. *Long Measure* is used in measuring length or distances only, without regard to breadth or depth.

3 barleycorns, (<i>bar.</i>)	make 1 inch,	marked	<i>in.</i>
12 inches	" 1 foot,	"	<i>ft.</i>
3 feet	" 1 yard,	"	<i>yd.</i>
5½ yards, or 16½ feet	" 1 rod, perch, or pole,	"	<i>r. or p.</i>
40 rods	" 1 furlong,	"	<i>fur.</i>
8 furlongs, or 320 rods	" 1 mile,	"	<i>m.</i>
3 miles	" 1 league,	"	<i>l.</i>
60 geographical miles, or } 60½ statute miles }	" 1 degree,	"	<i>deg. or °.</i>
360 degrees make a great circle, or the circumference of the earth.			

Note.—The barleycorn is now seldom employed as a measure. The inch is usually divided into *tenths*.

CLOTH MEASURE.

VII. *Cloth Measure* is used in measuring cloth, lace, and all kinds of goods which are bought or sold by the yard.

2½ inches, (<i>in.</i>)	make 1 nail,	marked <i>na.</i>
4 nails, or 9 in.	" 1 quarter of a yard,	" <i>qr.</i>
4 quarters	" 1 yard,	" <i>yd.</i>
3 quarters	" 1 Flemish ell,	" <i>Fl. e.</i>
5 quarters	" 1 English ell,	" <i>E. e.</i>
6 quarters	" 1 French ell,	" <i>F. e.</i>

SQUARE MEASURE.

VIII. *Square Measure* is used in measuring surfaces, or things whose length and breadth are considered without regard to height or depth; as land, flooring, plastering, &c.

144 square inches (<i>sq. in.</i>)	make	1 square foot,	marked <i>sq. ft.</i>
9 square feet	"	1 square yard,	" <i>sq. yd.</i>
30 $\frac{1}{2}$ square yards, or }	"	1 sq. rod, perch, or pole,	" <i>sq. r.</i>
272 $\frac{1}{2}$ square feet	"	1 rood,	" <i>R.</i>
40 square rods	"	1 acre,	" <i>A.</i>
4 roods, or 160 square rods	"	1 square mile,	" <i>M.</i>
640 acres			

CUBIC MEASURE.

IX. *Cubic Measure* is used in measuring solid bodies, or things which have length, breadth, and thickness, as timber, stone, boxes of goods, the capacity of rooms, &c.

1728 cubic inches (<i>cu. in.</i>)	make	1 cubic foot,	marked <i>cu. ft.</i>
27 cubic feet	"	1 cubic yard,	" <i>cu. yd.</i>
40 feet of round, or }	"	1 ton,	" <i>T.</i>
50 ft. of hewn timber }	"	1 foot of wood, or }	" <i>c. ft.</i>
16 cubic feet	"	a cord foot }	" <i>C.</i>
8 cord feet, or }	"	1 cord,	" <i>C.</i>
128 cubic feet }	"		

Note.—A pile of wood 8 feet long, 4 feet wide, and 4 feet high, contains 1 cord. For, 8 into 4 into 4 is equal to 128.

WINE MEASURE.

X. *Wine Measure* is used in measuring wine, alcohol, molasses, oil, and all other liquids except beer, ale, and milk.

4 gills (<i>gi.</i>)	make	1 pint,	marked <i>pt.</i>
2 pints	"	1 quart,	" <i>qt.</i>
4 quarts	"	1 gallon,	" <i>gal.</i>
31 $\frac{1}{2}$ gallons	"	1 barrel,	" <i>bar.</i> or <i>ddl.</i>
42 gallons	"	1 tierce,	" <i>tier.</i>
63 gallons, or 2 barrels	"	1 hogshead,	" <i>hhd.</i>
2 hogsheads	"	1 pipe or butt,	" <i>pi.</i>
2 pipes	"	1 tun,	" <i>tun.</i>

BEER MEASURE.

XI. *Beer Measure* is used in measuring beer, ale, and milk.

2 pints (<i>pts.</i>)	make	1 quart,	marked <i>qt.</i>
4 quarts	"	1 gallon,	" <i>gal.</i>
36 gallons	"	1 barrel,	" <i>bar.</i> or <i>ddl.</i>
1 $\frac{1}{2}$ barrels, or 54 gals.,	"	1 hogshead,	" <i>hhd.</i>

DRY MEASURE.

XII. *Dry Measure* is used in measuring grain, fruit, salt, &c.

2 pints (<i>pt.</i>)	make 1 quart,	marked	<i>qt.</i>
8 quarts	" 1 peck,	"	<i>pk.</i>
4 pecks or 32 qts.	" 1 bushel,	"	<i>bu.</i>
32 bushels	" 1 chaldron,	"	<i>ch.</i>

Note.—In England, 36 bushels make a chaldron.

TIME.

XIII. *Time* is naturally divided into days and years; the former are caused by the revolution of the Earth on its axis, the latter by its revolution round the Sun.

60 seconds (<i>sec.</i>)	make 1 minute,	marked	<i>min.</i>
60 minutes	" 1 hour,	"	<i>hr.</i>
24 hours	" 1 day,	"	<i>d.</i>
7 days	" 1 week,	"	<i>wk.</i>
4 weeks	" 1 lunar month,	"	<i>mo.</i>
12 calendar months, or 365 days and 6 hours, (nearly,)	} " 1 civil year,	"	<i>yr.</i>

The following are the names of the 12 calendar months into which the civil year is divided; with the number of days in each:

January,	(Jan.)	<i>first</i>	month,	has	31	days
February,	(Feb.)	<i>second</i>	"	"	28	"
March,	(Mar.)	<i>third</i>	"	"	31	"
April,	(Apr.)	<i>fourth</i>	"	"	30	"
May,	(May)	<i>fifth</i>	"	"	31	"
June,	(Jun.)	<i>sixth</i>	"	"	30	"
July,	(July)	<i>seventh</i>	"	"	31	"
August,	(Aug.)	<i>eighth</i>	"	"	31	"
September,	(Sept.)	<i>ninth</i>	"	"	30	"
October,	(Oct.)	<i>tenth</i>	"	"	31	"
November,	(Nov.)	<i>eleventh</i>	"	"	30	"
December,	(Dec.)	<i>twelfth</i>	"	"	31	"

The number of days in each month may be easily remembered from the following lines:

"Thirty days hath September,
April, June, and November;
February, twenty-eight alone,
All the rest have thirty-one;
Except in Leap year, then is the time,
When February has twenty-nine."

CIRCULAR MEASURE OR MOTION.

XIV. *Circular Measure* is applied to the divisions of the circle, to latitude and longitude, and the motion of the heavenly bodies.

60 seconds (")	make 1 minute, marked '
60 minutes	" 1 degree, " °
30 degrees	" 1 sign, " s.
12 signs, or 360°	" 1 circle, " s.

XV. MISCELLANEOUS TABLE.

12 units	make 1 dozen, (doz.)
12 dozen or 144	" 1 gross.
12 gross, or 1728	" 1 great gross.
20 units	" 1 score.
56 pounds	" 1 firkin of butter.
100 pounds .	" 1 quintal of fish.
196 pounds	" 1 barrel of flour.
200 pounds	" 1 barrel of pork.
24 sheets of paper	" 1 quire.
20 quires	" 1 ream.

A sheet of paper folded in two leaves, is called a *folio*.

A sheet folded in four leaves, is called a *quarto*, or *4to*.

A sheet folded in eight leaves, is called an *octavo*, or *8vo*.

A sheet folded in twelve leaves, is called a *duodecimo*, or *12mo*.

A sheet folded in eighteen leaves, is called an *18mo*.

Note.—Formerly 112 pounds were considered a quintal.

THE END.

This book should be returned to
the Library on or before the last date
stamped below.

A fine of five cents a day is incurred
by retaining it beyond the specified
time.

Please return promptly.

~~JAN 20 1941~~